PART III

Staff Reports

1. *Business Cycles*

STATISTICAL INDICATORS

A few months after the recovery in business activity began in August 1954, we compiled a table designed to (1) test the hypothesis that the strength of a recovery in its early stages depends upon the level from which it starts and (2) permit us to compare the strength of the current recovery with that of earlier cyclical revivals. The full table shows the percentage changes in each of some fifty monthly and quarterly economic series during the first 3, 4, 5, 6 . . . 24 months of the revivals that began in July 1924, November 1927, March 1933, June 1938, October 1949, and August 1954. Table 1 is an abbreviated version of this compilation.

A rough measure of the level from which a recovery starts is provided by the magnitude of the preceding contraction. To rephrase our hypothesis, moderate contractions can be expected to give rise to moderate recoveries, severe contractions to vigorous recoveries. Consequently the columns in the table are arranged from left to right according to the severity of the preceding contraction, as measured by the average percentage decline in three indexes of business activity.[1] On this scale, the 1953-1954 contraction turns out to be next to the mildest in the list.

The recoveries in many of the series, most notably that of the Federal Reserve index of industrial production, rank themselves roughly in order of the severity of the preceding contractions, and the hypothesis underlying the table is substantially supported. The effect appears during the first few months of the recovery and persists for some time, although it can, of course, be upset by developments peculiar to the recovery. The most notable example of this in our table is the effect of the Korean War, which began in June 1950 after

[1] This is an extension of the method used by Arthur F. Burns and Wesley C. Mitchell in *Measuring Business Cycles* (National Bureau of Economic Research, 1946), Table 156. The three indexes are American Telephone and Telegraph Co., Ayres (Cleveland Trust Co.), and Persons-Barrons, and are adjusted for long-term trend.

the 1949 recovery had been under way for some eight months. The first six months (October 1949-April 1950) produced increases comparable to those in other recoveries from mild contractions. But the increases registered for the first fifteen months (to January 1951) are well above most of the other entries in the table.

TABLE 1

PERCENTAGE CHANGES IN SELECTED ECONOMIC SERIES AFTER BUSINESS CYCLE TROUGHS, ARRAYED ACCORDING TO AMPLITUDE OF PRECEDING BUSINESS CYCLE CONTRACTION, 1927-1955

	Nov. 1927 to May 1928	*Aug. 1954 to Feb. 1955*	*Oct. 1949 to Apr. 1950*	*July 1924 to Jan. 1925*	*June 1938 to Dec. 1938*	*Mar. 1933 to Sept. 1933*
	FIRST SIX MONTHS AFTER THE TROUGH					
1. Nonagricultural employment		+0.9	+2.0		+4.2	+11.3
2. Industrial production	+4.0	+8.1	+10.4	+17.1	+22.7	+40.0
3. Gross national product[a]	−0.7	+4.6	+8.0	+10.0	+8.7	+11.4
4. Personal income	+0.7	+2.1	+7.0	+6.3	+4.0	+11.2
5. Retail sales	0	+3.9	+4.1	0	+8.6	+13.6
6. Wholesale prices	−0.4	+1.1	+0.8	+3.8	−1.4	+15.8
7. Industrial stock prices	+12.3	+18.3	+14.4	+23.2	+20.5	+66.1
	Nov. 1927 to Feb. 1929	*Aug. 1954 to Nov. 1955*	*Oct. 1949 to Jan. 1951*	*July 1924 to Oct. 1925*	*June 1938 to Sept. 1939*	*Mar. 1933 to June 1934*
	FIRST FIFTEEN MONTHS AFTER THE TROUGH					
1. Nonagricultural employment		+4.4	+9.1		+7.6	+17.4
2. Industrial production	+16.0	+17.1	+27.1	+19.5	+40.9	+40.0
3. Gross national product[a]	+11.9	+10.7	+25.0	+16.2	+12.0	+23.5
4. Personal income	+10.2	+8.6	+19.8	+12.0	+9.9	+23.5
5. Retail sales	+2.7	+11.2	+24.0	+11.8	+16.2	+18.2
6. Wholesale prices	−1.5	+4.4	+16.6	+5.1	+0.9	+19.0
7. Industrial stock prices	+60.5	+37.5	+31.5	+52.6	+15.2	+60.2
	Nov. 1927 to Nov. 1929	*Aug. 1954 to Aug. 1956*	*Oct. 1949 to Oct. 1951*	*July 1924 to July 1926*	*June 1938 to June 1940*	*Mar. 1933 to Mar. 1935*
	FIRST TWENTY-FOUR MONTHS AFTER THE TROUGH					
1. Nonagricultural employment			+10.9		+8.8	+19.7
2. Industrial production	+12.0		+22.9	+24.4	+50.0	+50.0
3. Gross national product[a]	+10.6		+31.6	+14.7	+20.5	+27.5
4. Personal income	+9.3		+28.3	+13.2	+14.5	+31.7
5. Retail sales	+2.7		+17.0	+8.8	+25.2	+31.8
6. Wholesale prices	−2.7		+14.6	+1.7	+1.0	+17.7
7. Industrial stock prices	+18.5		+45.1	+58.9	−6.0	+67.0

[a] Changes are measured over the first two, first five, and first eight quarters after the quarterly business cycle trough.

Note: The base for each percentage change is the three-month average centered on the trough month of the business cycle. All series except 6 and 7 are adjusted for seasonal variation. The percentage amplitudes of the preceding contractions (see text) are: Oct. 1926-Nov. 1927 — 9; July 1953-Aug. 1954 — 14; Nov. 1948-Oct. 1949 — 18; May 1923-July 1924 — 22; May 1937-June 1938 — 45; and June 1929-Mar. 1933 — 75.

Line	Source
1	Bureau of Labor Statistics; data not available before 1929.
2	Board of Governors of the Federal Reserve System.
3 and 4	Unpublished estimates by Harold Barger and Lawrence Klein through 1940; Department of Commerce estimates thereafter.
5	Department store sales before 1938, Board of Governors of the Federal Reserve System; sales of all retail stores from 1939, Department of Commerce.
6	Bureau of Labor Statistics; excluding farm products and foods.
7	Dow-Jones Co., Inc.

The pace of the current recovery has been more or less what one would expect in view of the mild decline in business activity that preceded it. That is to say, the percentage rates of increase in such measures of aggregate activity as gross national product have been moderate. This statement may seem surprising since the increases exceeded most published predictions and have given rise to descriptions of the current expansion as "unprecedented." Although certain aspects of the current expansion are undoubtedly unprecedented, this is not true of the rate of increase in output, employment, or income. Economic experience in previous cyclical recoveries apparently can help us to evaluate current experience and to formulate sound judgments about future prospects.

Of course, the character of a cyclical expansion is not wholly dependent on what has happened in the previous contraction. Nor do expansions maintain their pace indefinitely. Almost all of the economic measures shown in the table are substantially higher at the end of fifteen than at the end of six months. But a comparison of the last two panels of the table tells a different story. In the 1927 recovery, the increases for the first twenty-four months (November 1927-November 1929) are lower than those for the first fifteen (November 1927-February 1929). By November 1929, the general business contraction was already under way. In the 1949-1951 and 1924-1926 recoveries, some twenty-four-month increases are smaller, and others not much larger, than the fifteen-month increases – indicating a decline or markedly reduced rate of growth in the interval. Only in the 1933-1935 and 1938-1940 recoveries were there substantial increases between the first fifteen and the first twenty-four months. Even these increases did not match the rates attained during the first six months. Rather surprisingly, in none of the five recoveries was the advance in wholesale prices appreciably greater at the end of twenty-four months than at the end of fifteen – in four instances prices declined in this interval.

Work has continued on the compilation and analysis of diffusion indexes, on the interpretation of the behavior of particular economic indicators, and on the extension of our business cycle chronology. A paper of mine presenting some new results on diffusion indexes was published in the October 1955 issue of *The American Statistician,* under the title, "Diffusion Indexes: A Comment." Victor Zarnowitz presented a paper at the December 1955 meetings of the American Statistical Association on "Manufacturers' Orders as Indicators of Cyclical Revivals and Recessions," and is revising it for possible publication as an Occasional Paper. Alexander Pitts has extended the business cycle chronology to 1954. The peak and trough dates are:

	Monthly	*Quarterly*	*Calendar Year*	*Fiscal Year (ending June 30)*
Trough	October 1949	IV 1949	1949	1950
Peak	July 1953	II 1953	1953	1953
Trough	August 1954	III 1954	1954	1954

During 1956, we are planning to prepare a volume on business cycle indicators, which will bring together papers published in recent years, include new papers, and provide historical data for selected indicators and diffusion indexes.

GEOFFREY H. MOORE

SUBCYCLES

Seasonally corrected time series often seem to show waves too short, or too slight, or both, to be called specific cycles, yet too persistent to attribute to causes that the economist can afford to ignore. In the shoe, leather, hide industry, the cause of these "subcycles," which average about a year and a half in duration, became fairly evident in the course of our studies. There is every reason to suppose that the basic factors that generated subcycles in the shoe, leather, hide sequence operate in other industries too, though in different combinations and proportions.

But, whatever the cause of subcycles in a particular industry, their economic significance will differ depending on whether or not they

tend to occur at roughly the same time in a wide variety of activities over a long stretch of years. To determine whether this general confluence was present, I selected thirty-three time series that cover a long period. These include the major general series having a broad economic coverage (composite general indicators were purposely avoided) as well as activity in many important industries. The list includes fourteen series on the output of investment goods as well as of consumption goods, six on financial markets, and thirteen nonagricultural price series. If specific subcycles are found to occur at more or less the same time in these data, such times, if they also accord with other information, may be tentatively designated as subcycles in the economy at large and used as a reference frame for further study.

Accordingly, for the years 1875 through 1941, specific subcycles were marked independently in each series. How a subcycle was identified is discussed in Chapter 4 of my *Consumption and Business Fluctuations: A Case Study of the Shoe, Leather, Hide Sequence.* For each month, in effect, the number of series in a contraction phase was subtracted from the number in an expansion phase. The net number of series expanding each month was cumulated. The operations were performed for each of four subdivisions and for all thirty-three series together. These constructed time series provided the backbone for the selection of periods when business activity seemed to be experiencing sufficiently general rises or falls to warrant their tentative inclusion in a reference subcycle scheme.

Information about the intensity of movements of broad aggregates and other pertinent information were also used. For the period 1921 to 1941, selections based primarily on these thirty-three series could be checked by recourse to a far richer collection of time series. These data pointed to the same subcycles with only slight modification of peak and trough dates. The more plentiful materials will also be used to extend the chronology through 1955.

Between March 1879 and June 1938, 16 business cycles have been identified; they average 46 months in duration. From August 1876 to April 1940, I identify 21 additional waves. If all of the waves are counted – 37 in all – they have an average duration of 20.7 months. Individual variation is wide; subcycles run from 54 to 8 months in duration; their median duration is 18 months. Expansions, as in business cycles, tend to be longer than contractions.

The selection of this series of dates has two objectives. The first, as indicated, is to reveal whether there appear to be times when movements too short, or too weak, or both, to be designated business cycles occurred in many activities at roughly the same time.

The second is to provide a tool for the examination of how various industries or various sorts of economic functions or aspects (output, prices, shipments, orders, stocks) participate in these movements. Such information is necessary to give meaning to the phenomenon of an economic subcycle. For the strength and diffusion of fluctuation in business as a whole is a matter of degree. When a *sufficient* number of industries or aspects of economic life have specific subcycles of specified intensities at roughly the same time, the episode is designated a subcycle. Thus the marginal "reference subcycle" is defined in terms of this just sufficient participation – an arbitrary judgment at best. The information concerning participation will further provide a few rough clues to the cause of specific and general subcyclical fluctuation and its relationship to the phenomenon of business cycles. During the year, I expect to prepare a few short papers dealing with these questions.

RUTH P. MACK

ANALYSIS OF BUSINESSMEN'S EXPECTATIONS

Last year we reported on preliminary efforts to use the Dun and Bradstreet surveys of businessmen's expectations to forecast changes in such economic aggregates as sales, employment, and inventories of manufacturers, wholesalers, and retailers. Though the scheme used

was primitive and was based on relationships obtaining in the pre-recession period 1949-1952, it seemed desirable to advance the forecasts on the basis of each new survey without revising the basic relationships to take account of more current data. In this way we hoped that any deficiencies of the method and of the underlying theory of the relationship between diffusion data and aggregate change would be brought sharply to light.

The main deficiency disclosed is a tendency for the estimated changes to run too high. This tendency affects all variables. But it is most glaring in the case of inventories and led to forecasts that failed to disclose any inventory liquidation in the recession period 1953-1954. At the same time, the fluctuations in the higher predicted rates of change roughly parallel corresponding fluctuations in the actual rates as disclosed in the estimates of the Department of Commerce.

Of the various hypotheses that might be advanced to account for this bias, we have considered three: (1) the period analyzed, embracing as it does the Korean reconversion crisis, is atypical of normal relations between expectations and subsequent outcomes; (2) the model used to relate diffusion data, actual and expected, to aggregate change is too rigid; and (3) the use of diffusion data as a sensitive index of aggregate change requires that the individual reports of directions of change be weighted by a relevant measure of firm size.

Concerning the first, we have achieved marked improvements in forecasting the level of estimated changes by using moving regression relations. The regressions are based on a fixed number of the most recent surveys and so are revised continuously in a manner analogous to the variation in a regular moving average. An interesting by-product of the process is the fact that in each succeeding regression, the quantitative effect of a given change in expectations on realized aggregate change is increased. Thus while expectations moved more sharply in the Korean period than they have since, they were associated with proportionately smaller changes in inventories. This fact suggests that there was considerable disappointment of businessmen's expectations during both the 1950 rise in activity and the subsequent decline in 1951. This tendency is clearest for inventories, and likewise easiest to understand; but it appears to have affected other economic variables as well.

Several of our results also throw light on the second hypothesis. We have at times improved our forecasts by adding variables to our model, for example, the recent change in the aggregate to be forecast. We have also found cases where expectations of rise and expectations of fall do not appear to be related to the aggregate change in a symmetrical fashion. And finally, there is evidence to suggest that the relation of diffusion data to aggregate change may not be linear. Evidence on this last point is mainly theoretical and is clearest in the case of weighted diffusion data. It will therefore need to be taken into account in our efforts to evaluate the third explanatory hypothesis mentioned above.

The argument for weighting diffusion data by a measure of firm size scarcely admits of serious opposition. Such weighting has been employed with success by the IFO-Institute for Economic Research of Munich, Germany, and it gets strong support from the well-nigh universal finding that the expectations of large firms tend to be more accurate than those of small.

Fortunately, we shall now be able to investigate this question for the Dun and Bradstreet data directly, for we have been granted permission to work with the punched-card file of individual-firm reports submitted in the expectations surveys from mid-1952 to date. These records are coded to conceal the identities of individual firms, but they are classifiable by industry and by various measures of firm size – in particular, by tangible net worth and in some cases by total sales. Besides providing the necessary data for constructing diffusion indexes of expectations weighted by the importance of the reporting firm, these records will (1) permit a rough test of the consistency of individual-firm expectations about related variables, (2) facilitate a study of the factors influencing the formation of expectations, and

(3) make possible an investigation of forecasting success as a function of firm size.

Also the Dun and Bradstreet questionnaire is now including a new pair of questions on manufacturers' new orders. The first question, introduced in the June 1955 survey, calls for new order information that compares expected orders two quarters hence with actual orders in the quarter just concluded, rather than with the corresponding quarter a year earlier, as hitherto. The second, introduced in the January 1956 survey, asks for corresponding information on the actual trend of new orders during the two quarters just closed when the survey is taken. Table 2 summarizes the results to date and includes corresponding results on the standard four-quarter basis.

Though experience with the new questions is limited, the following points already stand out:

1. In the four surveys to date, manufacturers have been less optimistic about new order prospects on a two-quarter basis than on the four-quarter basis terminating in the same quarter. Apparently, in each survey, a number of respondents felt that in the previous two quarters they had already experienced the full increase in new orders to be expected in the four-quarter period covered by the standard question. So they expressed this fact by shifting their expectations for the remaining two quarters to "no change" or "decrease." The correctness of this shift cannot be tested for all four surveys. But such a shift accords with

TABLE 2

COMPARISON OF TWO-QUARTER WITH FOUR-QUARTER SURVEYS OF BUSINESSMEN'S EXPECTATIONS, 1955 AND 1956

	EXPECTED CHANGES IN NEW ORDERS								ACTUAL CHANGES IN NEW ORDERS			
	June 1955 Survey		*Sept. 1955 Survey*		*Jan. 1956 Survey*		*April 1956 Survey*		*Jan. 1956 Survey*		*April 1956 Survey*	
	IV 54-IV 55	*II 55-IV 55*	*I 55-I 56*	*III 55-I 56*	*II 55-II 56*	*IV 55-II 56*	*III 55-III 56*	*I 56-III 56*	*IV 54-IV 55*	*II 55-IV 55*	*I 55-I 56*	*III 55-I 56*
All manufacturers:												
Number of firms	505	493	630	615	675	658	708	682	713	689	728	715
Percentage expecting:												
Increase	73	62	61	52	64	50	56	50	73	61	68	53
No change	24	22	36	38	33	38	41	39	22	26	27	30
Decrease	3	16	3	10	3	12	3	11	5	13	5	17
Net percentage expecting increase	70	46	58	42	61	38	53	39	68	48	63	36
Durable goods manufacturers:												
Number of firms	265	260	304	298	314	310	365	355	328	321	376	371
Percentage expecting:												
Increase	72	60	60	54	69	54	56	49	77	60	74	58
No change	24	23	38	36	28	38	39	37	17	25	20	26
Decrease	4	17	2	10	3	8	5	14	6	15	6	16
Net percentage expecting increase	68	43	58	44	66	46	51	35	71	45	68	42
Nondurable goods manufacturers:												
Number of firms	240	233	326	317	361	348	343	327	385	368	352	344
Percentage expecting:												
Increase	75	65	62	51	59	47	55	51	70	63	61	48
No change	23	21	35	40	37	37	43	41	25	26	34	35
Decrease	2	14	3	9	4	16	2	8	5	11	5	17
Net percentage expecting increase	73	51	59	42	55	31	53	43	65	52	56	31

Source: Dun and Bradstreet, Inc.

the general impression that the recent boom has been leveling off since the middle of 1955, and the two reports so far available on *actual* changes in new orders (see the surveys of January and April 1956) show the same shift from a four-quarter to a two-quarter basis.

2. The figures obtained on two-quarter actual changes in the January and April surveys this year confirm fairly well the corresponding two-quarter expected changes obtained in the June and September surveys of 1955. In fact, the two-quarter expectations are not notably less accurate than those for four quarters. The poorest forecasts on both bases were made in the September 1955 survey; compared with outcomes reported in the April 1956 survey, the four-quarter expectations of durable goods manufacturers were substantially too low, while the two-quarter expectations of nondurable goods manufacturers were about as much too high. That the two-quarter forecasts should compare so favorably with those for four quarters is somewhat surprising, for the former represent genuine forecasts whereas the latter concern a period that is half over at the time the expectations are formed and might therefore be expected to have greater accuracy. The result is the more striking in that the sample of firms reporting expectations has almost no firms in common with the subsequent sample reporting actual changes.

3. A somewhat more discriminating appraisal results from comparing shifts in business sentiment between successive surveys with corresponding shifts in actual outcomes. Between the June and September 1955 surveys, both two- and four-quarter expectations worsened. Compared with the actual change in conditions as revealed in the January and April 1956 surveys, the shift in four-quarter expectations was excessive, whereas the shift in two-quarter expectations fell short. Moreover, the insufficiency of the two-quarter shift in expectations reflects a contradictory migration of firms into the no-change category from both the rising and falling categories. This contradiction is not borne out by the shift in actual two-quarter experience, which shows the normal situation of a decrease in rising firms together with an increase in falling firms.

4. One systematic discrepancy between two- and four-quarter expectations is puzzling. On our usual convention of dating the expectation associated with a given interval at the midpoint of that interval, one would expect substantial agreement between the two-quarter expectations (or actuals) of one survey and the four-quarter expectations (or actuals) of its immediate successor. For example, the expectations for the interval IV 1955-II 1956 would be centered in the first quarter of 1956, and so would the subsequent expectations for the interval III 1955-III 1956. The presumed agreement, however, is missing. In every one of the three comparisons that can be made, the two-quarter expectations tend to be lower than the corresponding four-quarter expectations, and in fact are invariably lower on a net basis. Moreover, this tendency is borne out in the one comparison of actual experience that can be made – that for two-quarter actual changes in the interval II 1955-IV 1955 with the four-quarter actual changes in the interval I 1955-I 1956. Careful study of Table 2 does not reveal any pattern of developments over the period since last June to suggest that two-quarter prospects should have been appraised in a less favorable light than those for four quarters, nor does the like tendency of the actuals allow us to believe that we are dealing with a purely expectational bias. The possibility that seasonal factors may be involved must of course be considered for two-quarter diffusion data. But these would not be expected to produce discrepancies in the same direction in three successive comparisons of two- and four-quarter expectations. Besides, the expectations concern new orders, which in general do not disclose a sufficiently systematic seasonal component to require seasonal adjustment. For the present, therefore, we incline to the view that the smoothing involved in four-quarter comparisons submerges erratic factors more effectively than that involved in two-quarter comparisons, and thus that four-quarter diffusion indexes tend to have the

greater amplitude. Since our data cover only the leveling off phase of a period of expansion, two-quarter indexes can be expected to run lower than four-quarter ones.

MILLARD HASTAY

COSTS AND PROFITS

Labor cost per unit of product. The number of man-hours of work that must be paid for per unit of product is an important factor in cost. Annual indexes of man-hours per unit of product are available for many industries, especially for manufacturing industries between 1919 and 1950. We analyzed the changes that occurred in each industry during each expansion or contraction in its production (for which we have data). Better plant, equipment, and processes reduced input per unit in most expansions and in most contractions. Man-hours per unit, however, increased in 45 per cent of the contractions but in only 45 per cent of the expansions. A conformity index of −42, based on the rates of change in input per unit in all industries in all cycles of output, indicates that the decline in unit requirements during expansions was faster than the decline, if any, during contractions. These figures suggest that, in the absence of technological improvement, man-hours per unit would typically decline in expansions and rise in contractions.

In computing the general conformity index, we included observations for industries where we have information for only one or two cycles in output. We also computed indexes for individual industries where we had data for eight or more successive phases of output. Sixteen industries had conformity indexes somewhere between −100 and −26, seven industries had indexes between −25 and +25, and only one had a positive index of +26 or higher.

Although input per unit was usually smaller in the last year of an expansion than in the first, and larger in the last year of a contraction than in the first, the direction of change may not have been uniform throughout either kind of period. Accordingly, we constructed monthly estimates of man-hours per unit of product for the cement industry and the steel industry. Data on the direction of change in these and in two industries previously studied are summarized in Table 3. Declines in man-hours per unit predominated in all segments of expansion, and rises, in all segments of contraction. The predominance was smaller, however, in the last segment than in the earlier ones.

The foregoing conclusions, among others, were presented in a paper I read at a joint meeting of the American Economic Association and the American Statistical Association in December. We are now investigating monthly changes in other industries. A survey of available monthly data on man-hours and output, however, indicated that there are many

TABLE 3

NUMBER OF CHANGES IN MAN-HOURS PER UNIT FROM STAGE TO STAGE OF PRODUCTION CYCLES, CLASSIFIED BY DIRECTION, FOUR INDUSTRIES

STAGE		RAILROADS[a]		MEAT PACKING		CEMENT		STEEL		ALL FOUR	
From	*To*	*Rises*	*Falls*	*Rises*	*Falls*	*Rises*	*Falls*	*Rises*	*Falls*	*Rises*	*Falls*
I	II	0	6	0	4	1	2	0	4	1	16
II	III	0	6	1	3	1	2	0	4	2	15
III	IV	0	6	1	3	0	3	1	3	2	15
IV	V	1	5	0	4	2	1	2	2	5	12
V	VI	6	0	4	0	3	0	3	1	16	1
VI	VII	3	3	4	0	2	1	4	0	13	4
VII	VIII	4	1	2	2	3	0	3	1	12	4
VIII	IX	2	4	2	2	2	1	3	1	9	8

[a] In one cycle, input per unit did not change from VII to VIII.

Note: For a description of cycle stages, see Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles*, National Bureau of Economic Research, 1946, p. 29.

for which measures of man-hours per unit cannot be constructed without gross statistical indiscretion.

Cost and profit per dollar of sales or investment. A manuscript dealing with these ratios in eight major industries or groups of industries was completed. Expense ratios most often fluctuated inversely, and profit ratios directly, with sales (Table 4). The turnover of capital followed sales more closely than profit margins did, and return on net worth consequently was more closely related to sales than margins were. Changes in taxes on income and on excess profits occasionally caused aggregate profits, margins, and rates of return to change in one direction while the corresponding items, before taxes, changed in the opposite direction. Exceptions to the generalizations suggested by the table occurred mostly during the World War II, the period of price dislocation that followed, and the period of defense effort beginning in 1950.

The manuscript shows that profits of corporations manufacturing durables fluctuate more than those of corporations making nondurables, as might be expected. In a separate project, we are trying to analyze differences in profit experience among manufacturing industries and some mining industries in much greater detail. Each business expansion and contraction will be considered separately.

Profits and the stock market. Two new analyses confirm our previously reported conclusion that there is little relation between short-term changes in a company's earnings and short-term changes in the market value of

TABLE 4

YEAR-TO-YEAR CHANGES IN VARIOUS COST AND PROFIT AGGREGATES OR RATIOS, CLASSIFIED ACCORDING TO DIRECTION OF CHANGE IN AGGREGATE SALES, EIGHT INDUSTRIES, 1919-1954

	Percentage of Observations in Which Direction of Change in Item and Direction of Change in Sales Were:	
Item	*Similar*	*Opposite*
Aggregates:		
Operating expenses[a]	95	5
Overhead expenses[b]	79	21
Total expenses	97	3
Profits before tax	82	18
Profits after tax	79	21
Net worth	71	29
Ratio to sales of:		
Operating expenses	36	64
Overhead expenses	27	73
Total expenses	29	71
Profits before tax[c]	70	30
Profits after tax[c]	65	35
Ratio to net worth of:		
Sales	81	19
Profits before tax	74	26
Profits after tax	70	30

[a] Labor, materials, etc.

[b] Depreciation, property taxes, interest, etc.

[c] Includes some profits not derived from sales.

Note: Industries: manufacture of durables, 1919-1953; manufacture of nondurables, 1919-1953; trade, 1922-1952; construction, 1932-1952; railroads, 1919-1954; electric utilities, 1926-1953; gas companies, 1937-1953; Bell telephone system, 1920-1954. Some items were not available for some years.

its common stock. Our former analysis was made on a simultaneous plan. The change in a company's profits from the first quarter of 1928 to the second, for example, was compared with the change in value between the same two quarters.

In one of our new analyses, the change in earnings from the first quarter to the second is compared with the change in value from the second to the third, on the theory that the market does not react to the change in profits until the earnings report is published. In the other analysis, the change in value from the first quarter to the second is compared with the change in profits from the second to the third, on the theory that the market anticipates changes in earnings.

The correlation between profit changes and price changes indicated by either of these systems of comparison is even weaker than the correlation indicated by the simultaneous system. Dissimilar changes (profits up, value down; or profits down, value up) are almost as frequent as similar changes under all three systems.

But longer, more persistent changes in profits *are* reflected in prices. This becomes clear when an intermediate quarter of a business expansion or contraction is compared with a more or less remote terminal quarter (Table 5). From the third quarter of 1931 to the first quarter of 1933, for example, the stocks of nine companies with rising profits declined, on the average, 36 per cent. Their rising profits did not cause the price of their stocks to go up in the face of the generally deepening economic gloom; but the stocks of forty-five companies with diminishing profits declined much more; they fell, on the average, 53 per cent.

In deciding what prices to pay or accept, buyers and sellers of stocks are influenced by dividends as well as earnings, and dividends often are stationary while earnings fluctuate;

TABLE 5

AVERAGE PERCENTAGE CHANGE IN MARKET VALUE OF COMMON STOCKS OF CORPORATIONS WITH EXPANDING PROFITS, AND CORPORATIONS WITH CONTRACTING PROFITS, DURING 1929-1933 BUSINESS CONTRACTION

	FROM DATE INDICATED TO I 1933, COMPANIES WITH:				FROM II 1929 TO DATE INDICATED, COMPANIES WITH:			
	EXPANDING PROFITS		CONTRACTING PROFITS		EXPANDING PROFITS		CONTRACTING PROFITS	
QUARTER	*Companies (number)*	*Change (per cent)*	*Companies (number)*	*Change (per cent)*	*Companies (number)*	*Change (per cent)*	*Companies (number)*	*Change (per cent)*
II 1929	0							
III 1929	0				86	9	98	1
IV 1929	0				67	–17	98	–31
I 1930	0				25	–10	86	–28
II 1930	0				13	–10	84	–31
III 1930	1	–60	38	–73	9	–16	81	–45
IV 1930	4	–41	38	–66	7	–25	77	–60
I 1931	4	–46	40	–66	5	118	71	–57
II 1931	6	–32	44	–60	3	–2	71	–67
III 1931	9	–36	45	–53	2	–4	63	–71
IV 1931	29	–24	49	–34	1	–31	61	–79
I 1932	38	–16	49	–26	0			
II 1932	62	33	57	11	0			
III 1932	81	–16	58	–18	0			
IV 1932	111	–11	59	–9	0			
I 1933					0			

Note: Similar information is available for business contractions and expansions from 1920-1921 to 1937-1938; the statistical base, however, is thin in earliest years.

sometimes dividend payments and profits change in opposite directions. We are therefore planning to collect dividend data corresponding to our profits data, and to take account of dividends in a more refined analysis.

THOR HULTGREN

LABOR MARKETS DURING BUSINESS CYCLES

The long-term goal of the present study is to analyze the cyclical behavior of the labor market. Employment and hours, labor turnover, payrolls and earnings, labor productivity, and labor costs all must be considered in a systematic analysis of labor market activities. Work during the past year was almost entirely concentrated on the physical aspects of labor input: hours, employment, and labor turnover.

Hours and employment. The analysis of average hours worked per week and of employment was based on monthly National Industrial Conference Board data for the interwar period and on Bureau of Labor Statistics data from 1932 on.

In making the seasonal adjustment of the postwar data, we had an opportunity to experiment with data processing by large scale electronic computers, such as the Univac. We used an early program, developed by Julius Shiskin at the Bureau of the Census. The procedure was time-saving and, on the whole, produced good results at low cost. Some additional work by hand calculator proved necessary, but refinements in the program have reduced the number of such corrections required. Some preliminary findings follow:

1. The long-term downward trend in the length of the work week of the first four decades of the century was not pronounced during recent postwar years. In manufacturing, hours, on the average, remained almost the same. In nonmanufacturing, some industries showed a substantial reduction in hours (coal mining, railroads, and so forth) but the tendency was far from universal.

2. Cyclically, hours showed widely diverging patterns both in size of swing and in conformity to changes in business activity. Cyclical amplitudes ranged from fractions of an hour (wholesale trade) to four, five, or more hours (primary metals, textile mill products, coal mining).

3. Fluctuations in hours were smaller than in employment – for manufacturing, perhaps half as large. Industries with larger than average employment variations tended to show greater fluctuations in hours.

4. In general, the larger the employment amplitude, the smaller the variation in total man-hours accounted for by fluctuations in the length of the work week. Custom limits fluctuation in hours, so that, in comparison with changes in employment, changes in hours tended to be smaller in deep contractions than in mild ones, in durables than in nondurables, in producer than in consumer goods.

5. The lead of average weekly hours over employment and over turns in general business activity appeared both in industry as a whole and in every one of the thirty manufacturing and nonmanufacturing industries examined so far, though not invariably for every turn or cycle.

Labor turnover. Completed analyses of gross accession, gross separation, quit, discharge, lay-off, and net accession rates for total manufacturing were available from 1919 on. For the period after World War II, we added labor turnover rates for total durables and nondurables and for petroleum and coal products (with relatively low turnover and mild cycles) and for transportation equipment (with relatively high turnover and more pronounced cycles). These data should help us see how useful labor market turnover rates are for gaining an understanding of the dynamics of labor input. We can report only tentative findings:

1. Labor turnover rates vary widely among industries. In 1954, for example, the monthly separation rate for petroleum and coal products averaged about 1.1 per cent of employment, that for transportation equipment, 4.6 per cent. The differences between "minor industries" can be appreciably larger. Thus the

separation rate for petroleum refining was only 0.7 per cent per month, that for shipbuilding, as high as 12.5 per cent.

2. There is also considerable diversity in the amplitudes of labor turnover rates. During recent postwar cycles, average monthly separation rates in petroleum and coal products varied cyclically, both during expansions and during contractions, by about 0.8 per cent of employment (around an average level of about 1.2 per cent for the period). The comparable variation for transportation equipment was 4 per cent (around an average level of approximately 5 per cent). Measures of relative amplitude, in terms of percentage changes in turnover rates, show that separation rates in both industries varied cyclically by about 70 or 80 per cent of their average levels. A relation between levels and amplitudes of separation rates is suggested by these figures.

3. Labor turnover rates (specifically total accession, total separation, and quit rates) showed distinct downward trends during the 1920's and during the post-World War II period. Both periods were characterized by sustained high employment. However, institutional developments, like seniority rules, pension funds, and subsidized unemployment benefits, must also be considered in any analysis of this tendency.

4. Voluntary quit rates rose and fell with employment, showed distinct leads at peaks, but no similarly distinct timing relations at troughs. Workers evidently respond quickly to early signs of a softening labor market. But at business cycle troughs, early signs of increased demand for labor did not lead immediately to increased quitting. At this stage of the cycle, labor input is increased primarily by changes in average hours, rehiring of recent lay-offs, and hiring of the unemployed. Also the substantial lags in wage rates suggest that monetary inducements to change jobs are relatively weak in this phase.

5. Lay-off rates showed inverse cyclical conformity and tended to exhibit long leads at both peaks and troughs.

GERHARD BRY

INVENTORY CYCLES SINCE 1938

The purpose of the present study is to make a systematic analysis of available manufacturers' sales and inventory data for the period 1939-1954. The investigation is being carried out within the general framework of hypotheses and methods used by Moses Abramovitz in his *Inventories and Business Cycles, with Special Reference to Manufacturers' Inventories.*[1] The principal data to be analyzed are:

1. Monthly inventory and sales series (Office of Business Administration, two-digit industry classification, since 1939)
2. Individual commodity stocks and shipments series (Abramovitz' series or comparable ones)
3. Monthly inventory by stage of fabrication series (OBE, unpublished, restrictions on publication, two-digit industry classification)

Other data to be examined for possible relevance are:

4. Annual data on book value of inventories by stage of fabrication (Bureau of the Census, three-digit and certain four-digit industry classifications, 1947 and 1949-1953)
5. Quarterly inventory data (Securities and Exchange Commission and Federal Trade Commission, two-digit industry classification)
6. Manufacturers' new and unfilled orders series (OBE, certain two-digit industry classifications, since January 1948)

The study thus far reveals that, although stocks are somewhat smaller than prewar in relation to the total volume of business, postwar movements in business inventories have played an important role in cyclical disturbances. Changes in business inventories (i.e. business inventory investment) have varied widely, sometimes contributing to, sometimes dampening, cyclical instability. Changes in the rate of inventory investment have been relatively large in the early stages of both

[1] National Bureau of Economic Research, 1950.

contraction and expansion, larger in the contraction phases.

During the first two quarters of the recession of 1949, decreases in inventory investment accounted for 82 per cent of the decline in gross national product. During a similar period of the 1953-1954 recession, decreases in inventory investment actually exceeded the decline in gross national product by 5 per cent. During the first two quarters of the expansions that began in late 1949 and 1954, increases in inventory investment were 56 per cent and 42 per cent of increases in gross national product.

Preliminary analysis of quarterly data indicates that manufacturers' total inventories have moved with less lag than Abramovitz's findings indicated for the prewar period. Both deflated and book value series demonstrated a maximum lag of one quarter behind business cycle turns during the decade 1945 to 1955.

The behavior of inventory investment also differed somewhat from that described by Abramovitz. During both expansion periods of the two postwar cycles, total manufacturers' inventory investment reached its peak very early, more than two years prior to business cycle peaks. An additional cycle in inventory investment was noted in each instance, however, with peaks occurring at dates roughly coincident with business cycle peaks. During the two brief recessions since 1945, inventory investment troughs coincided with business cycle troughs. Movements in inventory series for major industry groups showed similar behavior. Turning points in total manufacturers' inventory investment have lagged turning points in rates of change in industry activity with a sufficient degree of consistency to suggest that the relationship between first differences in levels of stocks and in output or shipments should be carefully explored at the industry level.

During the months ahead, a more refined analysis will be carried out. Present plans call for the preparation of a manuscript by June 1956 covering the findings of the study.

T. M. STANBACK, JR.

MONEY AND BANKING

A volume is in preparation on the estimates of the money stock compiled by Anna J. Schwartz and summarized in last year's annual report. The first part of the volume will analyze the secular and cyclical behavior of the money stock; the second part will describe the methods of estimation and present some of the basic data used. I hope the volume will be completed during 1956.

A more intensive analysis of the role of monetary factors in the United States since 1875 is continuing. Phillip Cagan has been working on the factors determining the supply of money in an attempt to isolate the separate influence of changes in (1) the gold stock, (2) Treasury or Federal Reserve creation of currency and Reserve Bank deposits, (3) the reserve policy of banks, and (4) the form in which the public holds its money. A parallel study of the factors determining the demand for money balances is planned.

These monetary studies are being carried on in cooperation with the Workshop in Money and Banking of the University of Chicago. The Workshop has been continuing its study of the relative accuracy of the quantity theory of money and the income-expenditure theory in predicting short-run changes in income and prices. It has recently started an analysis of some monetary episodes to find out how far monetary changes can be regarded as autonomous.

The mutually supporting character of the Workshop's and the National Bureau's monetary studies is well brought out by a volume tentatively entitled, "Studies in the Quantity Theory of Money" which is being published by the University of Chicago Press under the auspices of the Workshop. This volume contains papers by Phillip Cagan, John Klein, Eugene M. Lerner, and Richard Selden, and an introduction by me. These papers present an analytical framework for the analysis of demand mentioned in the second paragraph, as well as much relevant empirical evidence.

MILTON FRIEDMAN

REGIONAL AND INDUSTRIAL FLUCTUATIONS

I have been measuring and analyzing the cyclical variations of manufacturing employment in thirty-three states during three business cycles. The cycles are identified with the following periods of business contraction and expansion: 1919-1921-1923, 1929-1933-1937, and 1948-1950-1953. The dates conform approximately to years of peaks and troughs in business activity. Data on manufacturing employment for the first two cycles are annual averages taken from the censuses of manufactures for the respective years. Data for the third cycle are monthly averages from the Bureau of Labor Statistics series, with peaks and troughs identified through the use of twelve-month moving totals.

A fourth cycle was introduced, which overlaps with the first – with an expansion from 1914 to 1919 and a contraction from 1919 to 1921. The use of 1919 as a proxy for a peak year, in the absence of data for 1918 or 1920, does not do much violence to the facts because the rise between 1914 and 1919 is far greater than either the 1918-1919 contraction or the 1919-1920 expansion.

I hope to discover whether there is any relation between the growth and decline of states and the amplitude of the cyclical swing they experience. In general, I expect to find the widest cyclical swings in declining economic regions.

A declining region contains workers who have not yet migrated to areas with growing per capita real income. It also contains idle plant capacity. It can thus adjust to cyclical expansions of demand more easily than a region where alternative employment opportunities exist and where new plant capacity must be installed before production can expand. A corollary of this is that the greater variability of the declining region will be observed in very short-run periods. The same relation may hold for seasonal fluctuations.

Of course, the kind of industries a region has largely determines the region's cyclical characteristics. The cyclical variability attributable to industrial composition can be isolated and eliminated by standardizing the cyclical variability of each state industry at the level of its national counterpart. By this method, a corrected state amplitude of aggregate employment presumably due to regional characteristics can be obtained.

The importance of industrial composition in accounting for state differences in the cyclical swings in employment is seen if one ranks the thirty-three states according to actual and hypothetical cyclical amplitudes. The Spearman coefficient of rank correlation is shown for each of the four cycles:

	Rank Correlation between Actual and Hypothetical Amplitudes
1948-1950-1953	+0.45
1929-1933-1937	+0.81
1919-1921-1923	+0.75
1914-1919-1921	+0.80

The size of a state also appears to have a strong influence on the corrected state amplitude. For example, in the 1948-1950-1953 cycle, the coefficient of rank correlation between size (average number of manufacturing employees during the period) and corrected amplitude is –0.41. The influence of size remains even if the states are stratified into size and growth classes.

Why should the large states tend to be less variable than the small? One hypothesis is that the larger the unit of observation, the greater the tendency for differences in the timing of peaks and troughs in different sectors of the state's economy to cancel out and reduce the amplitude of cyclical fluctuation in total employment.

One can test this hypothesis by examining the degree to which small states tend to exhibit more uniform timing patterns among their component industries than the large states do. Or one can group the more homogeneous small states into larger units of observation and determine the effect on cyclical amplitude. These computations are now being carried forward for the 1948-1950-1953 cycle. For this period, industrial employment data on a monthly

basis are published by the employment security agencies of each state.

The long-term trend in a state appears to have the expected influence on the corrected state amplitude. For the 1948-1950-1953 cycle, the rank correlation between corrected amplitude and growth is –0.35. In this cycle, therefore, the states with the more rapid long-term growth rates experienced smaller cyclical swings. In addition, analysis of variance tests indicate that growth has a significant influence on variability within size classes.

I am continuing this analysis on the relation between size, growth, and variability for the other three business cycles mentioned above. A brief report indicating how the analysis applies to a single state was published in the *Review of New Jersey Business,* January 1956, entitled, "Employment Cycles in New Jersey Manufacturing Industries."

GEORGE H. BORTS

OTHER STUDIES

Five studies were published during 1955 and early 1956:

Personal Income during Business Cycles, by Daniel Creamer

Consumption and Business Fluctuations: A Case Study of the Shoe, Leather, Hide Sequence, by Ruth P. Mack

Short-Term Economic Forecasting, Studies in Income and Wealth, Volume Seventeen

Policies to Combat Depression, Special Conference Series 7

The Korean War and United States Economic Activity, 1950-1952, Occasional Paper 49, by Bert G. Hickman

Two books are in press:

A Theory of the Consumption Function, by Milton Friedman

Measurement and Behavior of Unemployment, Special Conference Series 8

The monograph by Oskar Morgenstern, "International Financial Transactions and Business Cycles," will shortly be ready for review by the Board. Other manuscripts in preparation are "Harvest Cycles," by Geoffrey H. Moore, and "Cyclical Behavior of Federal Receipts and Expenditures since 1879," by John Firestone.

An exploratory study of the quality of credit in booms and depressions is reported in Section 4; Ilse Mintz reports on her study of cycles in foreign trade in Section 6.

2. *National Income and Capital Formation*

CAPITAL FORMATION AND FINANCING IN THE UNITED STATES

The results of this study of long-term trends and future prospects, initiated in 1950 with the aid of a grant from the Life Insurance Association of America, are being issued in a series of monographs and briefer papers as well as in a summary volume. The reports published to date are:

The Role of Federal Credit Aids in Residential Construction, Occasional Paper 39, by Leo Grebler

The Volume of Residential Construction, 1889-1950, Technical Paper 9, by David M. Blank

Capital and Output Trends in Manufacturing Industries, 1880-1948, Occasional Paper 41, by Daniel Creamer

The Share of Financial Intermediaries in National Wealth and National Assets, 1900-1949, Occasional Paper 42, by Raymond W. Goldsmith

Trends and Cycles in Capital Formation by United States Railroads, 1870-1950, Occasional Paper 43, by Melville J. Ulmer

The Growth of Physical Capital in Agriculture, 1870-1950, Occasional Paper 44, by Alvin S. Tostlebe

Capital and Output Trends in Mining Industries, 1870-1948, Occasional Paper 45, by Israel Borenstein

"Proportion of Capital Formation to National Products," by Simon Kuznets, *American Economic Association Proceedings,* May 1952

"Factors in the Demand for Capital Funds," by Simon Kuznets, *Investment of Life Insurance Funds,* edited by David McCahan, University of Pennsylvania Press, 1953

"Concepts and Assumptions in Long-Term Projections of National Product," by Simon Kuznets, *Long Range Economic Projection*, Studies in Income and Wealth, Volume Sixteen, 1954

"International Differences in Capital Formation and Financing," by Simon Kuznets, *Capital Formation and Economic Growth*, Special Conference Series 6, 1955

"Financial Structure and Economic Growth in Advanced Countries; An Experiment in Comparative Financial Morphology," by Raymond W. Goldsmith, *ibid.*

"Trends in Capital Formation and Financing in Agriculture," by Alvin S. Tostlebe, *The Journal of Finance*, May 1955

"Capital Formation and Financing Trends in Manufacturing and Mining, 1900-1953," by Sergei P. Dobrovolsky, *ibid.*

"Long-Term Trends in the Financing of Regulated Industries, 1870-1950," by Melville J. Ulmer, *ibid.*

The first of the following reports is in press and the second will soon go to press; the rest are being reviewed by the staff:

Capital Formation in Residential Real Estate: Trends and Prospects, by Leo Grebler, David M. Blank, and Louis Winnick

"Financial Intermediaries in the Saving and Investment Process in the American Economy, 1900-1952," by Raymond W. Goldsmith

"Capital Formation and Financing in Agriculture, 1870-1950," by Alvin S. Tostlebe

"The Economics of Industrial Growth: A Study of Capital Formation in Transportation and Public Utility Industries," by Melville J. Ulmer

"Capital Formation and Financing in Manufacturing and Mining," by Daniel Creamer, Israel Borenstein, and Sergei P. Dobrovolsky

The monograph, "Government Financial Capital Requirements," by Morris Copeland, is reported on below.

The summary volume on long-term trends in capital formation and financing is being written. The scope of the volume is suggested by the following outline:

Part I, the introductory part of the volume, has been completed. Chapter 1 discusses the concepts of capital formation, and the problem of financing; and Chapter 2, the meaning of long-term trends.

Part II will deal with trends in capital formation since 1869. Chapter 3 will discuss the relations between capital formation and national product; Chapter 4, the structure of capital formation by type, and the major ultimate users; and Chapter 5, the record for the private sectors of the domestic economy.

Part III will deal with trends in financing since 1900. Chapter 6 will discuss the main saver groups and the main forms of savings; Chapter 7, the broad trends in financing the major user groups, and industrial sectors; and Chapter 8, the changes in the importance of various groups of financial intermediaries and their possible effects on the availability of capital funds for various users.

Part IV will deal with the long swings in the rate of secular change. Chapter 9 will discuss the long swings in population, national product, and capital formation; and Chapter 10, long swings in financial flows and prices, for which the evidence is much more limited.

Part V will point out various implications of the findings. Chapter 11 will discuss the implications for the methodology of projection — the importance of the distinction between long-term trends and long swings, and the interrelations among the various trends and swings; and Chapter 12 will present the major elements in the historical past and the foreseeable future.

Like all outlines, the one above is subject to revision. The attempt throughout will be not only to set forth the major findings suggested by the estimates but also to explore the possibilities of various explanatory hypotheses. Both aims can be only incompletely realized. I hope that a draft will be completed before the end of 1956.

Work on the broad statistical framework of estimates of population, national product, and components — on a countrywide basis from 1869 to date — is completed. This part of the manuscript has been mimeographed and will be issued either as a supplement to the summary volume or as a second volume.

SIMON KUZNETS

Government

Work on "Government Financial Capital Requirements" was resumed during 1955 after an interruption of nearly a year.

Drafts of the first three chapters had previously been completed. These chapters deal with the nature of government financial requirements; the relation of such requirements to budget deficits; and approximate patterns in state and local requirements. During 1955, drafts of three more chapters were substantially completed and work on Chapter 7 – the last chapter except for a brief summary – was begun.

Chapter 4 traces the development of restrictions on state and local borrowing powers and the shifts in the apportionment of functions and of the responsibilities for financing them among different types of government units. Chapter 5 deals with the assumption by the federal government of some responsibility for maintaining a high and stable level of employment and examines the experience since 1929 with the problems and financial requirements this responsibility has entailed. Chapter 6 is mainly concerned with emergency fiscal procedures developed during the two world wars and the decade of the 1930's. It deals also with the growth of government financial assets, particularly in connection with the development of social insurance programs and of federal credit agencies. Chapter 7 is concerned with wartime deficit financing, international aid as a source of federal financial requirements, and certain considerations relating to debt retirement.

Assistance on this study during the year was provided by a small grant from the Ely Lilly Fund of the Cornell Social Science Research Center.

MORRIS A. COPELAND

CAPITAL FINANCING IN PETROLEUM AND STEEL

Our study of capital financing in the petroleum and steel industries was directed toward several objectives: (1) to establish how financing patterns of individual firms differed from those of the industries as a whole; (2) to explain differences in patterns between firms in the same industry and to find the reasons for changes in financing patterns; (3) to see what effect the availability of funds from "internal" sources had on the volume of gross capital expenditures; and (4) to compare, to the extent possible, charges for depreciation with replacement requirements.

Our data consist of sources and uses of funds for a sample of twenty-four oil companies and seventeen steel companies covering the period 1921-1953. The smallest oil company in our sample had total assets in 1953 of $16.0 million and the smallest steel company, $24.9 million. With the exception of certain capital expenditure breakdowns for the petroleum companies, all of the data were developed from published financial statements.

The analysis of financing patterns was based first on variations between companies, and over time for individual companies, in the relative roles of gross reinvested earnings (including the portion charged to depreciation) and of net changes in the value of preferred stock, long-term debt, and common stock (adjusted for revaluations) minus reinvested earnings. Then we examined changes in the roles of each of the components of gross reinvested earnings and of funds secured from the sale of securities. The relationships between these sources of funds were analyzed in terms of the effect upon them of the following variables: the size of the company, the capital expenditure rate (measured by the ratio of cumulated gross capital expenditures to book value of fixed property at the beginning of the period), the stability of earnings (measured by the ratio of average changes in earnings, from peak to trough and trough to peak in earnings, to average earnings for the period), and balance sheet debt to equity ratios. This was done for the periods 1921-1930, 1931-1940, and 1947-1953 (in some cases, the period 1946-1953 was employed).

The larger a company was, the more stable was its financing pattern. But size differences did not explain differences among companies

in the relative importance to them of the different sources of funds. Differences in capital expenditure rates between companies and for particular companies over time appeared to be the most important variable in explaining variations in the role of internal financing. The higher the capital expenditure rate, the greater tended to be the relative role of funds secured from the sale of securities.

The stability of earnings over time did not contribute to explaining differences between companies in the ratio of debt to equity capital as sources of funds. Indeed, the relationship appeared on the whole to be mildly negative (companies with less stable earnings plus interest tended to finance a somewhat larger share of their financial needs through debt).

Balance sheet ratios of debt to equity as of the end of 1946 seemed to have a clear relationship to the ratio of debt and equity capital as sources of funds in the 1947-1953 period. Companies with lower balance sheet debt ratios tended to finance more of their capital requirements through debt in the subsequent years. For 1921-1940, the relationship is obscured by a number of factors such as the frequent occurrence of negative earnings.

To explore further the relationship of differences in capital expenditure rates to patterns of financing, we aggregated data for years in which capital expenditures fell below the median rate in that period and for those in which they fell above it for each company in each of three periods. This was done for the several sources of funds as well as for working capital and capital expenditures.

Except for preferred stock, the volume of each source of funds was usually greater in high capital expenditure years than in low. Preferred stock conformed neither positively nor negatively to changes in capital expenditures; working capital, negatively.

If we turn from the direction of change to its amplitude, debt and common stock as sources of funds for oil companies fluctuated more widely, on the average, than capital expenditures between high and low capital expenditure years; depreciation and retained earnings, more narrowly. For steel companies, debt fluctuated again more widely than capital expenditures, depreciation and retained earnings less widely, with the pattern for common stock unclear because of variations between the three intervals into which the 1921-1953 period was broken.

When ratios for individual companies of gross reinvested earnings to gross capital expenditures were correlated with capital expenditure rates, the resulting rank correlations were either negative or roughly zero. There was no instance of a significant positive correlation for the relationship for either industry when cumulated data were used for each of three periods, 1921-1930, 1931-1940, and 1947-1953. This suggests that internal sources of funds have a relatively passive role in relation to the volume of gross capital expenditure — a conclusion reinforced by the finding that internal financing declines in relative importance in years of high capital expenditures.

Average capital financing patterns for the two industries were not representative of the financing patterns of individual firms comprising these industries. When each source of funds is expressed as a ratio to total sources, the dispersion in the resultant ratios proves to be very wide. The coefficient of variation for most ratios and in most time intervals exceeded a value of .5, and in some cases exceeded unity. However, there appeared to be some narrowing of variation in the post-World War II period. Changes in aggregate industry financing patterns were associated with almost as many cases of individual company changes in an opposite direction from those of the aggregates as cases of the same direction of change. This evidence suggests that for the categories of companies with which our study was concerned, industry characteristics do not play a significant role in determining capital financing patterns. We are currently pursuing further the analysis of the effects of profitability on the character of financing for our sample of companies.

Some experiments were made in measuring "real" replacement requirements for petroleum refining with the ultimate objective of comparing them to depreciation charges. On

the basis of cross-section data, the relationship between gross capital expenditures on petroleum refining, cumulated for groups of years, and net additions to petroleum refining capacity was examined. The former were expressed as a ratio to average capacity during the period, and the latter as a ratio to initial year capacity. A curve was fitted to the observations for a sample of companies. The estimated value of gross capital expenditures that corresponds to a zero increment in capacity may be taken to represent expenditures on replacement. This concept of replacement differs from the familiar concept of capital consumption. Deflating for price changes in capital goods, we found that expenditures on replacement per unit of capacity, measured by the above method, were 1.56 times as large in the 1947-1953 period as they were in the 1937-1939 one. This is probably largely the result of a positive relation between capital expenditures on replacement and on expansion, though differences in the quality of equipment in the two periods may have also affected replacement costs (a factor for which allowances are not made in the price index used as a deflator).

MICHAEL GORT

ECONOMIC GROWTH IN THE UNITED STATES

I spent the fall months on a review of the more general estimates of long-term movements of output, labor and capital input, and productivity. I presented a paper entitled: "Resource and Output Trends in the United States since 1870" at the Christmas meetings of the American Economic Association. It will be published in the Association's *Proceedings* and reprints will subsequently be distributed by the National Bureau as Occasional Paper 52.

I shall spend the next months studying the data on assets, liabilities, capital formation, and output compiled in connection with the study of capital formation and financing. By observing the movement of these series during economic fluctuations of different duration, I hope I can throw some light on the question whether there are significant cycles longer than those recognized in the National Bureau business cycle chronology, see whether there are any systematic features in the longer movements, and perhaps learn something more about the antecedents of serious depressions. It seems reasonable that if there are economic developments (other than secular developments) that carry over from one short business cycle to another, they are likely to show themselves in capital assets and liabilities considered in relation to measures of activity or to prices and yields.

MOSES ABRAMOVITZ

INTERSTATE DIFFERENCES IN ECONOMIC GROWTH

The two analyses outlined below form a part of the University of Pennsylvania Study of Population Redistribution and Economic Growth directed by Simon Kuznets and Dorothy S. Thomas. These analyses, together with other analytical results of the Study and the basic figures, will be published in a forthcoming volume of *Memoirs* of the American Philosophical Society. Work on the first analysis was begun in September 1955 and will commence on the second in the near future.

Long-term movements in state income, population, and capital. For four points in time, 1880, 1900, 1919-1921 and 1949-1951, data have been organized for each state on total personal income, service income (the sum of wages, salaries, and proprietors' income), and property income (the sum of rental income, personal interest income, and dividends). Each of these is expressed in both total and per capita terms. In addition, the service income figures have been subdivided into income originating in agriculture and in nonagriculture, and the respective industry estimates have been placed on a per worker basis. The data have been adjusted for changes over time in the national price level but not for differences among the various states in price level or trend.

These data will be used to analyze questions such as the following:

How has the geographical distribution of personal income changed since 1880? Are the states closer together or farther apart in their

per capita total, service, and property incomes? In service income per worker in agriculture, in nonagriculture, and in all industry?

What were the components that made for relatively high or low levels of per capita income in each state at each date? For relative growth or decline?

For each state and date, data have also been assembled on the state's total population and on the total, agricultural, and nonagricultural capital located there (except for 1949 to 1951, for which no data are available). The change in population between successive dates has been divided into that due to natural increase and that due to net migration; and the change in nonagricultural capital, into the share financed by residents of the given state and the share attributable to the net inflow of capital from other states.

Among the questions these data will be used to analyze are the following:

How has the geographical distribution of population changed since 1880? Did natural increase or did net migration make for growth (decline) in population in each state?

What changes have occurred in the country-wide distribution of total capital? To what extent was nonagricultural capital accumulation financed by residents of the state? By net external investment?

Finally, the data on state income, population, and capital will be brought together to examine more general questions:

To what extent were high rates of growth of income during this period associated with high rates of population growth and capital accumulation? What was the relation, if any, between interstate differences in levels and rates of change of per capita or per worker income and differences in net migration of persons and in net external investment?

The bulk of the data were compiled by members of the staff of the University of Pennsylvania Study of Population Redistribution and Economic Growth. The migration estimates were done by Everett S. Lee, the labor force estimates by Carol Brainerd and Ann Ratner Miller, and I made the income and capital estimates.

Interstate differences in the growth and characteristics of manufacturing. Data have been assembled for each state for the decennial census dates from 1879 to 1939 and for 1947 on the number of establishments, the average number of wage earners, total wages, value added, the value of products (available only through 1939), and total capital (available through 1919). These data will be used to analyze shifts in the location of manufacturing activity since 1879 and to compare the various states with respect to levels and trends in such characteristics as value added per wage earner, capital per wage earner, and capital per unit of product (net and gross).

The data to be used were also derived in the course of the University of Pennsylvania Study and are to be published in the volume previously mentioned. They are taken from the decennial manufacturing censuses but have been adjusted to improve comparability.

In addition, for about seventy individual manufacturing industries, comparable, though fairly broad, industrial classifications covering this period have been developed. Data on wages and wage earners in these individual industries in 1879, 1899, 1919, and 1947 are now being transcribed. These figures will make it possible to find out approximately how much the redistribution of manufacturing as a whole was caused by differences in the national growth rates of industries that differed in their initial location and how much by shifts in the geographical distribution of given industries.

The data for manufacturing as a whole and for individual manufacturing industries are also to be used to throw further light on the analysis of long-term movements in state income.

RICHARD EASTERLIN

OTHER STUDIES

Three conference proceedings volumes were published during 1955 and three are in press:

Capital Formation and Economic Growth, Special Conference Series 6

Short-Term Economic Forecasting, Studies in Income and Wealth, Volume Seventeen

Input-Output Analysis: An Appraisal, Studies in Income and Wealth, Volume Eighteen

Capital Formation: Concepts, Measurement, and Controlling Factors, Studies in Income and Wealth, Volume Nineteen (in press)

Problems in the International Comparison of Economic Accounts, Studies in Income and Wealth, Volume Twenty (in press)

Regional Income, Studies in Income and Wealth, Volume Twenty-one (in press)

A special conference on consumption and economic development was held in October, and the November meeting of the Conference on Research in Income and Wealth was devoted to a review of the national income estimates of the Department of Commerce. The proceedings at these conferences are described in Part Two. The meeting of the Conference on Research in Income and Wealth, in March 1956, was concerned with an appraisal of the 1950 census income data (see Part Two).

Milton Friedman's book, *A Theory of the Consumption Function,* is in press, and George Garvy's exploratory report on research in income size distribution is being edited. For a report on the study of postwar capital markets and on the exploratory study of credit and savings facilities see Section 4.

3. *Wages, Employment, and Productivity*

UNION MEMBERSHIP BY STATE, 1939 AND 1953

The most important gap in American statistics of union membership has been the absence of data showing the distribution of membership by state and region. This deficiency has now been repaired. With the cooperation of union officials, who have made their records available to him, and the use of published union records, Leo Troy has constructed reliable estimates of union membership in each state for 1939 and 1953. The figures and the percentage increases are shown in Table 6.

TABLE 6

TRADE UNION MEMBERSHIP IN THE UNITED STATES, BY STATE, 1939 AND 1953

	Membership (thousands)		*Increase*
	1939	*1953*	*(per cent)*
United States	6,517.7	16,217.3	148.8
New York	959.8	2,051.8	113.8
Pennsylvania	738.6	1,540.7	108.6
California	424.0	1,392.5	228.4
Illinois	590.7	1,358.7	130.0
Ohio	429.3	1,162.6	170.8
Michigan	269.1	1,062.0	294.6
New Jersey	200.6	645.4	221.7
Indiana	176.7	569.6	222.4
Massachusetts	208.9	546.1	161.4
Missouri	180.0	510.5	183.6
Wisconsin	193.9	418.7	115.9
Washington	175.3	393.6	124.5
Texas	110.5	374.8	239.2
Minnesota	133.5	327.6	145.4
Connecticut	63.2	232.1	267.2
West Virginia	153.5	223.9	45.9
Maryland	58.5	203.6	248.0
Oregon	77.4	201.5	160.3
Tennessee	71.0	187.3	163.8
Alabama	63.9	168.3	163.4
Iowa	73.9	159.2	115.4
Virginia	68.4	156.1	128.2
Kentucky	84.7	155.1	83.1
Florida	43.6	135.9	211.7
Georgia	35.7	135.8	280.4
Louisiana	37.8	135.8	259.3
Kansas	39.3	130.8	232.8
Colorado	40.2	114.2	184.1
District of Columbia	71.1	107.8	51.6
Oklahoma	33.7	86.7	157.3
North Carolina	25.7	83.8	226.1
Rhode Island	24.7	82.8	235.2
Montana	39.8	72.5	82.2
Nebraska	27.1	68.6	153.1
Arkansas	25.0	67.9	171.6
Maine	15.2	58.9	287.5
Utah	21.3	56.9	167.1
Arizona	15.6	55.7	257.1
Mississippi	13.0	50.0	284.6
South Carolina	12.2	49.7	307.4
New Hampshire	10.6	43.1	306.6
Idaho	11.5	29.1	153.0
Delaware	5.8	25.8	344.8
New Mexico	8.8	25.0	184.1
Wyoming	14.4	24.2	68.1
Nevada	6.3	21.8	246.0
Vermont	8.5	19.6	130.6
South Dakota	6.1	17.4	185.2
North Dakota	7.9	17.3	119.0
Not distributed	411.4	458.5	

TABLE 7

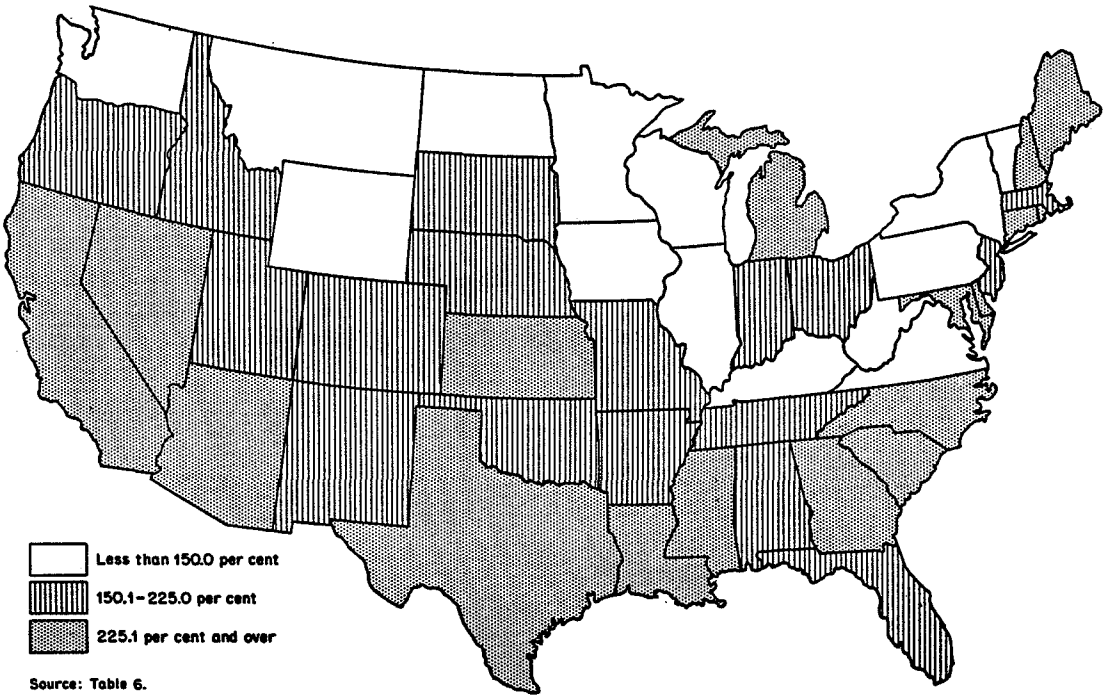
EXTENT OF TRADE UNION ORGANIZATION OF NONAGRICULTURAL EMPLOYMENT IN THE UNITED STATES, BY STATE, 1939 AND 1953

	Percentage Organized	
	1939	*1953*
United States	21.5	32.6
Washington	41.3	53.3
Montana	36.7	47.0
West Virginia	41.7	44.1
Michigan	20.0	43.3
Oregon	30.1	43.1
Indiana	21.7	40.0
Pennsylvania	27.6	39.9
Missouri	21.9	39.7
Illinois	25.9	39.7
Wisconsin	29.1	38.3
Minnesota	24.8	38.1
Ohio	24.4	38.0
California	23.4	35.7
New Jersey	16.1	35.2
New York	23.0	34.4
Nevada	18.2	30.4
Massachusetts	15.5	30.1
Wyoming	26.7	28.6
Colorado	17.6	27.8
Arizona	16.6	27.7
Rhode Island	10.2	27.4
Connecticut	11.3	26.5
Utah	19.3	26.3
Maryland	12.0	25.2
Iowa	17.3	25.0
Kentucky	22.5	25.0
Alabama	16.1	24.9
New Hampshire	7.3	24.6
Kansas	13.4	23.9
Tennessee	15.3	22.6
Idaho	13.7	21.5
Arkansas	12.7	21.5
Maine	7.2	21.4
District of Columbia	21.7	21.2
Nebraska	12.5	19.7
Louisiana	9.6	19.5
Vermont	11.4	18.9
Delaware	7.8	18.4
Virginia	12.8	17.4
Texas	10.3	16.7
Florida	11.3	16.2
Oklahoma	10.4	16.1
North Dakota	10.9	15.6
Georgia	7.0	15.0
Mississippi	6.5	14.7
South Dakota	7.1	14.4
New Mexico	11.2	14.2
South Carolina	4.0	9.3
North Carolina	4.2	8.3

Within the fourteen-year interval, total union membership in the continental United States increased by almost 9.7 million, or 148.8 per cent. Of the total increase, more than two-thirds (68.7 per cent) accrued to the ten states with the largest membership in 1953 (New York, Pennsylvania, California, Illinois, Ohio, Michigan, New Jersey, Indiana, Massachusetts, and Missouri); and less than 2 per cent, to the ten with the smallest membership (South Carolina, New Hampshire, Idaho, Delaware, New Mexico, Wyoming, Nevada, Vermont, South and North Dakota). Thirty-four states exceeded the average relative gain, while fourteen and the District of Columbia fell below it (Map 1). In general, there was a westward shift in membership from the Atlantic seaboard to the Middle West and the Pacific Coast regions.

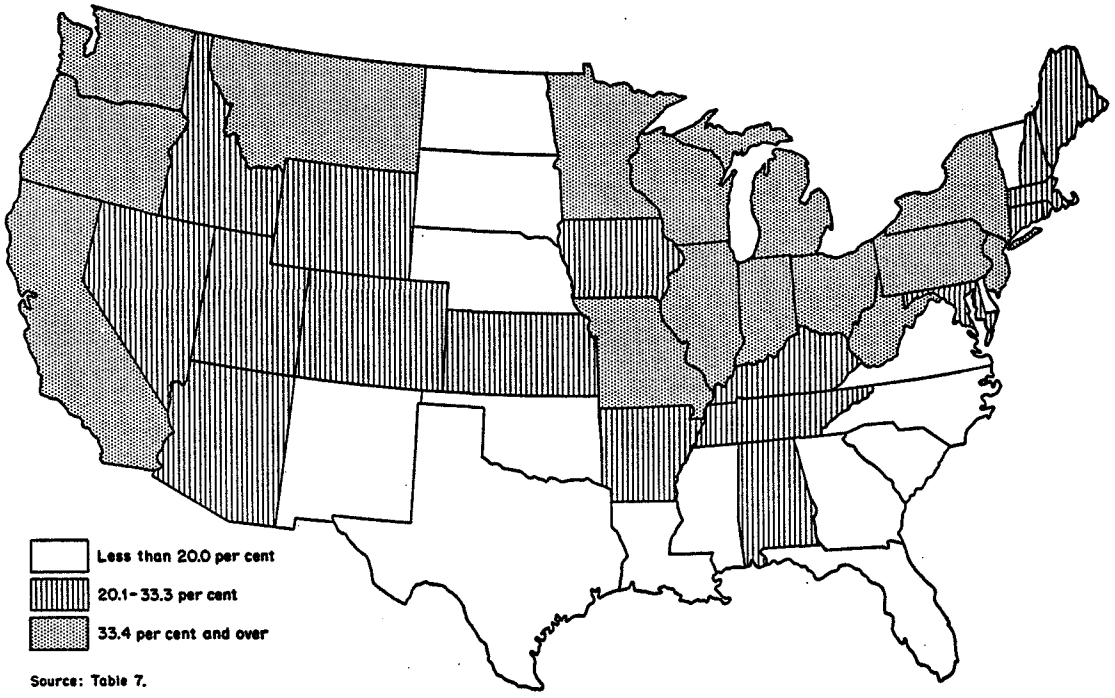
Since absolute membership is only one measure of the size and strength of unions, Table 7 shows, for the same years, the percentage that union membership is of nonagricultural employment in each of the states. For the entire country, the proportion of nonagricultural employees who were organized rose from 21.5 per cent in 1939 to 32.6 per cent in 1953. In 1939, fifteen states and the District of Columbia exceeded the national average. In 1953, thirteen of those states (but not Wyoming, Kentucky, or the District of Columbia), and Michigan and New Jersey, were above the average (Map 2).

Union membership increased faster than nonagricultural employment in all states, lagging only in the District of Columbia. In twenty states, the growth of membership so far exceeded the growth of employment that their position in a scale of states ranked by the percentage of workers organized was higher in 1953 than it had been in 1939. The increase in organization was particularly great in Michigan, Indiana, Missouri, New Jersey, Massachusetts, Rhode Island, Connecticut, Maryland, and New Hampshire. On the other hand, the standings of such states as West Virginia, Wisconsin, Minnesota, Ohio, California, New York, Pennsylvania, Wyoming, Iowa, Kentucky, Virginia, Florida, New Mexico, and the



MAP 1

Percentage Increase in Trade Union Membership, 1939-1953



MAP 2

Extent of Trade Union Organization of Nonagricultural Employment, 1953

District of Columbia declined. Underlying the changes in the standings of the states were differences in the extent of organization of various industries and the relative importance of these industries in each state's total nonagricultural employment. Moreover, in a number of states, the ratio of membership to employment has remained small in most industries, despite the considerable gains in relative membership indicated by Map 2.

Sectionally, the most organized region of the United States in 1939 was the Pacific region (California, Washington, and Oregon); in 1953, it was the East North Central states (Ohio, Indiana, Illinois, Michigan, and Wisconsin). The difference in the extent of organization among the states was large in each year. In 1953, it ranged from a high of 53.3 per cent in Washington, to a low of 8.3 per cent in North Carolina, while New York and California barely exceeded the national average in either 1939 or 1953. The study on which this summary is based explores the characteristics of union membership and employment in the various states and helps to account for the changing status of union organization.

LEO WOLMAN

TRENDS IN WAGES AND PRODUCTIVITY IN THE UNITED STATES

A study of the long-run trends in money wages, in "real" wages, and in output per unit of labor and capital was begun in 1954 with the assistance of a grant from the Alfred P. Sloan Foundation. Reports on the several parts of this project follow.

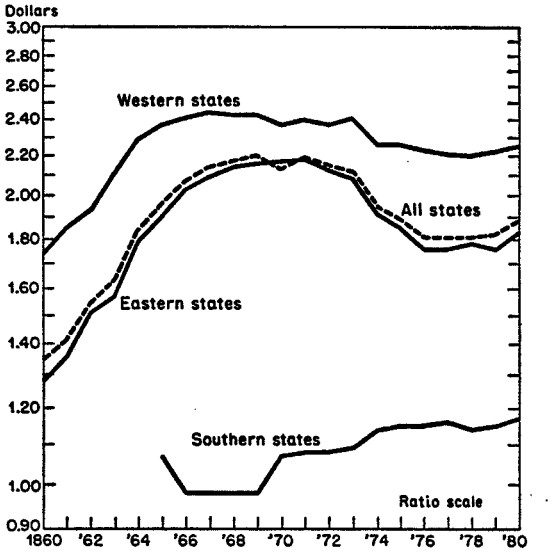
Wages, 1860-1890

I have completed the analysis of wages in manufacturing for the period ending in 1880, using the data contained in the *Weeks Report*, one of the volumes in the census of 1880. They were predominantly daily wage rates, rather than earnings, and were gathered for some one date each year from the payroll records of individual firms. In some ways they are less satisfactory than the wage data provided in the *Aldrich Report* made ten years later and covering the whole period 1880-1890, but the *Weeks Report* includes a much larger number of establishments, in a wider range of industries, and in many more states. In addition, it tells us more about how the wage materials were gathered, offers possibly better statistics on hours, and provides supplementary knowledge on strikes, methods of paying wages, and on whether wages include allowances for overtime, extras, and deductions.

In the analysis of these data, I have weighted the wages by the number of persons reported as gainfully occupied in the industry and the state in which the reporting establishments were located. These wage data, so weighted, were grouped by industry and region. They reveal the following behavior:

1. The average wage in manufacturing industries rose from $1.35 per day in 1860 to $1.88 per day in 1880 (Chart 1). (A rise of 53 cents or 39 per cent.)

CHART 1
Weighted Average Daily Wage of Nineteen Industries, by Regions, 1860-1880



NOTE: For sixty-nine establishments with data covering the whole period 1860-1880. The number of establishments was not constant for some of the intervening years owing to gaps in the data. Weighted by the number gainfully employed in each industry in each state, as reported by the decennial censuses. Source: Joseph D. Weeks, *Report on the Statistics of Wages in Manufacturing*, Dept. of the Interior, Census Office, 1886.

2. Wages moved very differently in the three major regions of the country. Throughout the twenty years, wages were highest in the western states and lowest in the southern states. Wages rose most in the East and least in the South, so that eastern wages, while always lying between southern and western wages, were closer to the former in 1860 but to the latter in 1880.

3. The rise was not continuous. During the twenty years, the average wage went through a large cycle: rising sharply during the Civil War, continuing upward to a flat peak in 1869-1871, and falling, first gradually then rapidly, to a flat trough in 1876-1878. The wage rate of $1.88 in 1880 was substantially below the peak wage of $2.15 in 1869-1871 and a few cents above the trough wage of $1.80 in 1876-1878.

4. Both eastern and western wages went through a major fluctuation during 1860-1880, but western wages responded less sensitively to both the Civil War and the depression of the 1870's. Southern wages manifested still different behavior, for they were only 18 per cent higher in 1880 than in 1860. However, data were available for only a small number of establishments in a small number of industries in the South, and for the Civil War years they were probably completely unreliable.

5. All the industries had higher average wages in 1880 than in 1860, but they varied widely in the degree of rise, the greatest increase having been 86 per cent (breweries and distilleries), and the smallest only 7 per cent (iron-foundries). In general, the largest increases were registered by those industries whose wages were below average in 1860. Nevertheless, the high wage industries in 1860 tended to be the high wage industries in 1880, and the low wage industries in 1860 to be the low wage industries in 1880, also.

6. There was little uniformity of cyclical behavior among the nineteen industries, but there seems to have been no tendency for wages to lag in their upturns and downturns behind the National Bureau reference dates – certainly for the 1873 reference peak and the 1878 reference trough.

7. Wages were also analyzed for five skilled occupations (blacksmiths, carpenters, engineers, machinists, and painters) represented in nine to twenty-six establishments and cutting across industry lines. These wages were remarkably close in absolute amount, and their average rise was the same as that of the average for the nineteen industries. Thus the change in the average wages in these nineteen industries does not seem to have been due in any important degree to a change in their occupational composition.

8. Wages were also analyzed for laborers in seventy-eight establishments, covering most industries. These rose only 29 per cent – less than wages in any of the five skilled occupations. The ratio of the wages of laborers to those of skilled craftsmen was 63 per cent in 1860 and 58 per cent in 1880. Paradoxically, nearly all of this widening of the differential occurred during the Civil War.

9. The *Weeks Report* provides a good deal of information on the number of hours constituting a day's work, though only at five-year intervals. They show that the weighted average work-day (ten and a third hours) was almost exactly the same in 1880 as it had been in 1860 and that the only significant departure from this average occurred in 1865, when the work day seems to have been almost eleven hours. Except during or just after the Civil War, the hourly and the daily wage rates apparently moved very closely together.

I am now investigating the behavior of wages during 1881-1890 – a period for which it is necessary to rely on the less comprehensive *Aldrich Report,* supplemented with data from the Bureau of Labor. I shall soon be free to compare changes in wages with variations in prices for the entire period 1860-1890. I hope also to be able to report on the response of wages to increases and decreases in employment and production and to throw some light on variations in wages in several other industries besides manufacturing – including building, mining, teaching, and agricul-

ture. I plan to submit the manuscript at the end of June.

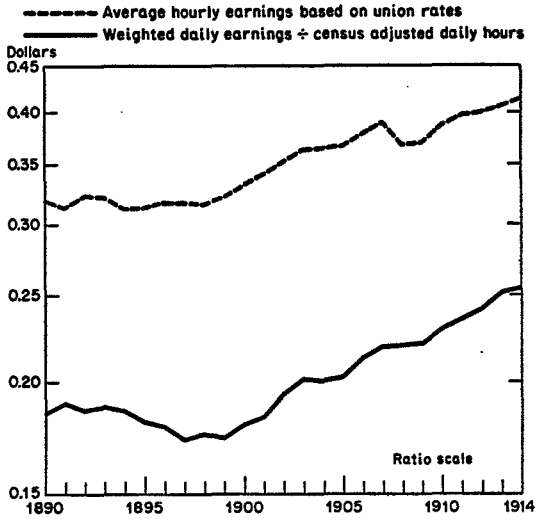
CLARENCE D. LONG

Wages 1890-1914

The collection and processing of money wage data for individual manufacturing industries, 1890-1914, has been completed. We still have to obtain an all-manufacturing wage series and evaluate the results. The methods used in preparing the wage series were described in last year's annual report. In addition to the industry series mentioned there, series for the following industries have been completed: malt liquors, glass, electrical machinery, pottery and clay products, chemicals, and foundries and machine shops. No hourly wage series were previously available for these industries during this period, except for a series for foundries and machine shops based on union rates.[1]

CHART 2

Hourly Earnings in Foundry and Machine Shops, 1890-1914



As Chart 2 shows, hourly earnings in foundries and machine shops, as estimated from establishment data, behave quite differently from the series based on the union rates reported to have been paid in that industry. Throughout the period our series is considerably lower than the union rate series, and its increase from 1890 to 1914 is 38 per cent as against 29 per cent for the union rate series.

The data on the cost of living compiled by state governments, which had earlier seemed to be promising, proved to be too fragmentary to use. We are now exploring the possibility of constructing a rent index from newspaper advertisements, indexes of the retail prices of clothing and home furnishings from mail order catalogues, and an index of the price of gas for household use from the records of utility companies. These seem to be the main avenues along which it may be possible to improve on present cost-of-living indexes for this period.

ALBERT REES
DONALD JACOBS

Wages since 1914

Hourly wages, using manufacturing wages as an example, have increased almost without interruption in the forty years between 1914 and 1955. Starting at 22 cents an hour in 1914, they had by November 1955 multiplied nearly nine-fold (to $1.93). On two occasions during this period, from 1920 to 1922 and from 1929 to 1933, they declined – by 7 cents an hour in the first instance and by 13 cents in the second.

Since the period as a whole was one of rising prices, it follows that real hourly earnings advanced much less than money earnings. Between 1914 and November 1955, the average factory laborer's real hourly wage increased three and one-quarter times – a remarkable advance in real wages in a period of less than a half-century. So strong was the upward pull in real wages that they advanced even during the depressions of 1920 and 1929, except for a small decline in 1932.

An interesting, and perhaps unexpected, feature of this record of mounting real wages is the variety of economic conditions under which real hourly earnings managed to rise. This is shown in the following tabulation:

[1] See Paul H. Douglas, *Real Wages in the United States, 1890-1926*, Houghton Mifflin, 1930, pp. 88, 89, and 96. Douglas' series is union rates, 1907-1914, extrapolated back to 1890 by payroll data.

Period	Percentage Increase In Factory Real Hourly Earnings
1914-1919	24
1919-1929	20
1929-1939	38
1939-1949	26
1949-November 1955	25

LEO WOLMAN

Productivity

Estimates of productivity and related variables are now largely completed for as many segments of the economy as it is feasible to cover. For thirty-three industry groups and for the economy as a whole, we have made estimates of total factor productivity and of the ratios of output to labor and to capital inputs separately from 1899 or earlier. Estimates of output per man-hour alone are available for several additional groups and for eighty individual manufacturing industries over the same period. Other industries are covered for shorter periods of time.

I presented a preliminary analysis of productivity trends based on the available estimates at a joint session of the American Economic and Statistical Associations, on December 29, 1955. The paper, *Productivity Trends: Capital and Labor*, will be published in a forthcoming issue of the *Review of Economics and Statistics* and reprints will be subsequently distributed by the National Bureau as Occasional Paper 53. Between 1899 and 1953 there were no declines in total productivity in the thirty-three industry groups, and but few negative changes in output per man-hour in the eighty industries. More than three-fourths of the average annual rates of change fell between 1 and 3 per cent. The dispersion of changes in the output-input ratios was much greater in shorter periods than over the fifty-four years as a whole. The variability in rates of change in the ratios over six subperiods was greater for the industry groups than for the economy, and still greater for individual industries.

Differences among industries in rates of change in total factor productivity were less than those in either output per man-hour or output per unit of capital input over the period as a whole and in each of the subperiods. Also, rates of change in total factor productivity varied less than those in either of the partial ratios. The explanation is that large (small) increases in output per man-hour were associated with, and no doubt partly attributable to, large (small) increases in capital per man-hour.

When the various industry groups and industries are ranked by rate of change in their output-input ratios in the subperiods, marked shifts in relative position of the groups and industries appear. There has been a fairly persistent tendency for industries with low rank to improve their relative position and for the erstwhile leaders to drop in the scale.

The final phase of the productivity trends study will involve an analysis of the interrelationships between productivity changes and connected variables – both those that are primarily casual and those that reflect the economic impact of productivity change at the economy and industry levels. Preliminary explorations have been undertaken into the relationship between relative changes in productivity and relative changes in factor prices, product prices, output, and employment, by industry.

Detailed technical notes on the sources and methods used in preparing the estimates of productivity and the component variables by industry, and for the economy as a whole, are now being written. When these are complete, the body of the report will be drafted.

JOHN W. KENDRICK

PRICES AND WAGES IN THE SOUTH, 1860 TO 1880

The slow economic recovery of the South after the Civil War raises several questions for study. As soon as a southern area was occupied by Union forces, the confederate dollar became worthless. How did prices react when one currency was wiped out and another substituted in its place? The breakdown of transportation immediately following the war was acute. What effect did this have on North-

South price differentials, and how long did it take to restore damaged transportation and communication facilities? The post-bellum South remained predominantly a producer of raw materials. What were the terms of trade facing the region during the two decades between 1860 and 1880? The end of the war brought a social upheaval in the South. Negroes – formerly slaves – became free men. What effect did Emancipation have on the prevailing wage rates? How did white wages compare with Negro wages? Skilled wages with unskilled? Southern wages with northern wages in the same trades, and wage movements with price movements?

My study falls into three parts: (1) a comparison of selected commodity prices in the South and in the North before and after the Civil War, (2) the construction and analysis of wholesale price indexes for the city of New Orleans and (3) an analysis of the structure and movement of money and real wage rates in different parts of the South and North.

Comparison of northern and southern commodity prices. My southern price quotations were taken from the market report section of the New Orleans *Prices Current* and my northern quotations from Anne Bezanson's *Wholesale Prices in Philadelphia, 1852-1896.*[1] To measure the price differential at a given date between New Orleans and Philadelphia, the difference in the price of the same commodity is expressed as a percentage of the New Orleans price. The average price differential of six commodities normally imported from New Orleans and three commodities normally exported from the city are presented in Table 8.

The Civil War ended for New Orleans when Captain David Farragut and a northern naval force captured the city in April 1862. New Orleans became a federal holding in the midst of Confederate territory, and for some time goods could not easily enter or leave the city. The price differentials that existed between New Orleans and Philadelphia were large, even though both cities were now in union hands. However, as time passed, and transportation and communications improved, these differentials steadily narrowed. By 1866, the prewar price differentials between New Orleans and Philadelphia had been re-established.

TABLE 8

AVERAGE OF PRICE DIFFERENTIALS BETWEEN NEW ORLEANS AND PHILADELPHIA, BY QUARTERS, 1860-1866

YEAR AND QUARTER	DIFFERENCE AS PERCENTAGE OF NEW ORLEANS PRICE	
	Six Imports[a]	*Three Exports*[b]
1860:		
I	+11.0	−13.5
II	+12.9	−19.0
III	+11.7	−26.4
IV	+11.3	−17.3
1861:		
I	+13.3	−24.8
1862:		
II	+69.2	−68.0
III	+58.8	−21.2
IV	+46.2	−18.7
1863:		
I	+34.3	−37.4
II	+34.4	−24.6
III	+33.4	−15.0
IV	+29.6	−13.1
1864:		
I	+14.5	− 8.2
II	+11.0	−18.7
III	+16.2	−12.3
IV	+28.6	−10.1
1865:		
I	+19.6	+ 0.5
II	+16.6	−13.1
III	+10.8	−17.8
IV	+18.8	−14.8
1866:		
I	+15.5	− 8.2
II	+ 1.8	−11.7
III	+ 7.8	−18.1
IV	+ 4.5	−22.0

[a] Lard, pork, salt, hay, flour, oats.
[b] Sugar, molasses, beef.

Detailed price indexes. The New Orleans price series will be used to construct the following fifteen price indexes:

1. All series
2. Products originating on American farms
3. Products other than those originating on American farms
4. Foods

[1] University of Pennsylvania Press, 1954.

5. Non-foods
6. Producer goods
7. Consumer goods
8. Goods entering into capital equipment
9. Articles of human consumption
10. All commodities other than of human consumption
11. Building materials
12. Nondurable goods
13. Durable goods
14. Raw materials
15. Processed goods

These indexes cover many of the same aspects of the economy investigated by Frederick C. Mills in his studies of more recent years.

Structure and movement of wages. With the aid of a grant from the Social Science Research Council, I was able to collect from manuscript sources 375 more or less complete wage series for thirteen different areas in the South. I have divided the wage quotations of each area into four classifications: foremen, skilled craftsmen, craftsmen's helpers, and unskilled labor. Both intra- and inter-area comparisons over time will be made. These southern wage series will also be compared to the northern wage series of Wesley C. Mitchell given in his *Gold, Prices, and Wages under the Greenback Standard*,[2] and also to my southern price series.

EUGENE M. LERNER

THE DEMAND AND SUPPLY OF SCIENTIFIC PERSONNEL

Our monograph, *The Demand and Supply of Scientific Personnel,* is in press. The table of contents is as follows:

Chapter

1 A General View of the Technological Professions
2 Demand and Supply: Methods of Analysis
3 Factors Influencing the Demand for Engineers and Chemists
4 The Supply of Engineers
5 Supply and Demand for Mathematicians and Physicists

There are also ten appendixes, including a survey of the available data on the earnings of engineers, their educational training, and so forth.

The supply of engineers has been drawn from three sources: engineering colleges, other college-trained persons, and the skilled labor force which receives most of its training through experience. In recent years, roughly 50 per cent of engineers have been engineering graduates, almost 10 per cent have been college graduates specializing in natural sciences, education, and so forth, and the remaining 40 per cent have been nongraduates.

The graduates of engineering schools have been a rising fraction of all college graduates: they were only one-thirtieth of the total at the beginning of this century but are now one-tenth. We have made various extrapolations of the trends of aggregate college enrollments and the fraction of engineering students and obtained estimates of the number of graduates in 1965 ranging between 50,000 and 60,000 — compared with 8,000 in the 1920's and 32,000 during the early 1950's.

The field of specialization of graduates of engineering schools has been found to be fairly responsive to the changes in the relative salaries of these specialties. If one assumes a two-year lag before changes in relative salaries cause changes in the composition of degrees, the two changes have been closely correlated in direction.

The nongraduate engineers were about two-fifths of all engineers in 1940 and 1950, and, of course, an even higher proportion in earlier times. There is relatively little information available on this group, partly because most surveys of the engineering profession are made by the professional societies, whose memberships are made up chiefly of graduate engineers. Approximately one-third of the nongraduates had some college training, and one-fourth had not completed high school. The scraps of evidence we possess suggest that these nongraduates are used relatively more often in management and construction, and less often in applied research, than the gradu-

[2] University of California Press, 1908.

ate engineers. The nongraduate engineers are so important and unstudied a component of the engineering profession that no wholly satisfactory comparison of supply and demand for engineers will be possible until this gap in our knowledge is closed.

DAVID M. BLANK
GEORGE J. STIGLER

OTHER STUDIES

Personal Income during Business Cycles, by Daniel Creamer, which deals in part with wages, unemployment compensation, and other forms of labor income, was published. Harold Barger's study of employment trends, productivity and costs, in wholesale and retail trade, *Distributions' Place in the American Economy since 1869,* also was published. *Trends in Employment in the Service Industries,* by George J. Stigler, and *The Growth of Public Employment in Great Britain,* by Moses Abramovitz and Vera Eliasberg, are in press. Also in press is the conference proceedings volume, *Measurement and Behavior of Unemployment.*

Gerhard Bry's book, "Wages in Germany, 1871-1945," is being prepared for publication, and Clarence D. Long's monograph, "The Labor Force and Economic Change," is being reviewed by the Board.

Other studies of employment and the labor market are reported by George H. Borts and by Gerhard Bry in Section 1. The reports by Moses Abramovitz and by Richard Easterlin in Section 2 deal with studies of productivity, income, and employment trends.

4. Banking and Finance

POSTWAR CAPITAL MARKETS

The Postwar Capital Market Study started operations in the summer of 1955 under a grant from the Life Insurance Association of America. The study's primary objective is an analysis of the structure and development of the American capital market in the decade 1946-1955 that ties a description of the institutional setting and a discussion of the major economic problems involved to an integrated statistical framework of the flow of funds through the capital market and of the assets and liabilities of financial institutions active in the market.

Two steps, partly overlapping, are planned. The first is the development of a set of balance sheets and of financial fund flow statements for all major groups of participants in the capital market – financial institutions as well as nonfinancial business enterprises, households, and governments. The second step will be the preparation of four monographs. Three of these, dealing with the main sectors of the capital market – the markets for government securities, for corporate securities and loans, and for nonfarm mortgage loans – are discussed below by their authors, Roland Robinson, Eli Shapiro, and Saul Klaman. Each study will deal with the underlying economic forces, the institutional setting (including the competition among financial institutions), government policies, gross and net yields, significant changes in these factors during the postwar decade, and important differences between the postwar and prewar periods.

In the fourth monograph, I shall try to tie the results of the other three studies into the framework of the whole saving and investment process, to deal with common problems such as developments in the investment banking machinery and the influence of interest and tax rate changes, and to link developments in the postwar decade to relevant trends during the preceding twenty to thirty years.

The basic statistics are being organized into three bodies of data:

1. Annual estimates of saving and investment for the years 1946 through 1955, continuing (and for 1946 through 1949 revising) those of *A Study of Saving in the United States.*[1] In addition to providing the back-

[1] Raymond W. Goldsmith, Princeton University Press, 1955.

ground for the analysis of the postwar capital market, the new figures will permit comparison with the 1920's and 1930's. I hope that a first version of these estimates will be completed in the summer of 1956.

2. Annual summary statements, also for 1946 through 1955, of the flow of funds through the capital market. These statements will essentially be limited to a rearrangement of Federal Reserve figures; both worksheet data and recently published statistics will be used. We shall, however, show separate figures for some groups of financial institutions (chiefly sales and personal finance companies and common trust funds). This phase of our work was almost completed by the end of 1955.

3. A quarterly detailed statement of the flow of funds through the capital market for the years 1953-1955. This statement will differ from the Federal Reserve pattern in several respects and will be developed throughout from primary sources. The main differences – apart from the quarterly basis – are (a) the provision of separate figures for a larger number of sectors, both among financial institutions and among nonfinancial business enterprises; (b) the distinction of a larger number of assets and liabilities (e.g. the separation of common and preferred stock, of the bonds of the major industries, and of several types of mortgage loans); (c) more elaborate adjustments for valuation changes; and – possibly the most important difference – (d) the use to the greatest extent possible of gross rather than net flows. Work in this area, which involves direct inquiries from several groups of financial intermediaries, started near the end of the year. A first draft of the statement is expected to become available during the summer of 1956.

Participants in the project, in addition to those mentioned above, include Jack Farkas, George Horwich, David Meiselman, and Morris Mendelson.

RAYMOND W. GOLDSMITH

The Government Securities Markets

The markets for the two types of government securities – federal, and state and local – embraced in this section of the project have the common feature of high credit quality. The overriding power of taxation supports all federal securities and most of those of state and local governments. In addition, the ability to indemnify creditors by creating money adds further support to the securities of the federal government. The markets differ, however, with respect to liquidity and the volume of secondary transactions. Work on the market for state and local government obligations was initiated first, and it is only for this area that preliminary conclusions can be reported.

The statistical work on the local government securities market (done largely by Jack Farkas) includes: transcription of underwriting and pricing statistics from the *Bond Buyer,* calculation of a preliminary market sales and inventory series by weeks for the ten-year period 1946-1955; estimation of a quarterly yield series for several maturities and various quality classes of tax-exempt securities; and calculation of the gross market spreads for a small sample of underwriting deals. No formal analysis has yet been undertaken but several interesting characteristics have already appeared:

1. The relationship between the yields on fully taxable and tax-exempt securities (both of high quality) has been widely variable during the postwar years. This could be interpreted as a fluctuating premium for tax exemption, that is, the amount the marginal buyer is willing to pay for this privilege. But our present evidence does not confirm this generalization. The premium on tax-exempt securities has not fluctuated at all closely with changes in present or prospective tax rates. Relative market supplies of these securities appear to be a better explanation of the premium.

We have brought George Lent's estimates of tax-exempt security ownership up to date. These data suggest that the composition of

buying groups has changed greatly during the postwar decade (a finding, confirmed by underwriters). Some buying groups have high marginal tax rates; others are themselves tax-exempt institutions for whom tax exemption in the securities they purchase is almost a redundancy. These shifts in the composition of buying groups do not appear to be correlated in any significant way with changes in the relative size of the tax exemption premium.

2. Quality differentials among tax-exempt securities lead to pronounced differentials in yields. Capital gains realized on these obligations are not exempt from taxation. For this and other reasons, the yield premium required for a risk to be assumed appears to be fully as great as it is in any other area of financial investment, possibly greater.

3. Because of the factors described above in (1) and (2), the prices of outstanding tax-exempt securities, even very high-grade ones, fluctuate through wide ranges, wider than those of Treasury obligations and even than those of outstanding corporate obligations. And since only coupon interest and not the yield accrued according to annuity computations is exempt from taxes, low-coupon obligations experience unusually wide price fluctuations.

4. Although it is generally believed that large corporations have a material cost advantage over intermediate-sized businesses in the raising of capital, this does not appear to be true of the financing of large and intermediate-sized governmental units. Here cost includes the interest or coupon cost as well as the cost of underwriting taken in the form of gross spreads between buying and re-offering prices. The interest or coupon cost of borrowing to moderate-sized governmental units with a high credit standing does not appear to exceed that of larger governmental units. Indeed competitive bidding often seems to lead to smaller gross margins on issues of around a million dollars than on issues of ten or 100 times that amount. Our data do not disclose a clearly optimum size of issue, but large issues often cost more than moderate-sized issues. Investment bankers frequently advise borrowers to break up their offerings into several units so as to avoid the extra costs involved in a larger issue. It cannot be argued by analogy that business concerns of intermediate size, but with high credit standing, could expect access to the open capital markets at costs proportionately no greater than those met by large concerns. But size may be less of a factor, and credit-worthiness more of a factor, than has often been assumed. Our data cannot be used to suggest that very small governmental units, such as those borrowing a quarter of a million dollars or less at one time, enjoy cost equality with larger borrowers.

ROLAND I. ROBINSON

The Corporate Securities and Loans Market

Since commencing work on the project in late summer, I have been engaged in three related but separate tasks, two of which can be best described as exploratory in character.

In gathering data, David Meiselman and I separated out a number of financial institutions from the Federal Reserve annual money-flow data where they are presently combined with other institutions or groups. These institutions include brokers and dealers, investment companies, sales finance companies, personal finance companies, factors, and common trust funds. We are currently attempting to provide quarterly flow-of-funds data, on a gross basis, for these institutions for the years 1953-1955 and plan to complete this task in the early spring of 1956.

A fair share of my time has gone into exploring whether enough information is obtainable to make possible the preparation of an institutional monograph on the volume of assets handled, portfolio classification and management, income, types of service rendered, classification of customers, and so forth, in the personal trust business. Regrettably the exploration has shown that the necessary information is not yet available. However, a

short questionnaire will be sent to a sample of the larger personal trust departments early in the spring of 1956 with the expectation of securing data on trends in total asset holdings and on portfolio composition for recent years. This information will satisfy the need for data on personal trust funds for our comprehensive statistics and will provide a useful addition to our knowledge of one of the large but relatively little known financial institutions.

We plan to develop and supplement the existing interest rate and stock yield series so that the movements of funds into and out of the market can be analyzed and the changes in the utilization of funds from the demand side be explained. An itemization of financial developments in the corporate securities market has been accumulated largely on the basis of interviews with representatives of the financial community. We are continuing our efforts to compile a yield series on private placements in the postwar years, although to date the task has proved to be formidable. Present plans call for organizing the data on the market for corporate securities in tables sometime this summer so that the analysis of the material and preparation of the monograph can get under way in the fall of 1956.

To understand more fully the increasing importance of the nonfinancial corporation as a financial institution, a series of interviews on the formulation of financial policy decisions by management is planned for the late spring.

ELI SHAPIRO

Nonfarm Mortgage Market

Since my association with the Postwar Capital Market Study in mid-November, my efforts have been concentrated on (1) the development of new data on the operations of mortgage companies, (2) the preparation of a more precise estimate of postwar mortgage indebtedness underlying real estate bonds than has hitherto been available, and (3) the development of detailed quarterly balance sheet data on savings and loan associations and the Federal Home Loan Banks.

To develop financial and other data on the operations of mortgage companies, we have, after several exploratory meetings and negotiations, arranged for the Federal Housing Administration to make available to us aggregate annual balance sheet statements for a sample of FHA-approved mortgages. To supplement these annual data with quarterly figures, we developed a questionnaire to be distributed to the largest 300 mortgage companies in the United States. This questionnaire was sent out early in 1956 through the cooperation and facilities of the Mortgage Bankers Association of America. It is expected that information from FHA records and the questionnaire to mortgage companies will provide the basis for development of the final quantitative analysis of this sector of the capital market.

The value of real estate mortgage bonds outstanding in the postwar period, while admittedly only a small fraction of total mortgage indebtedness, has never been accurately known. In an attempt to quantify the total more accurately and to describe its composition, we made a thorough examination of information on this subject contained in Moody's volumes for 1946 and 1955. Preliminary examination of the data suggests that the total value of real estate mortgage bonds outstanding has declined from approximately $1.5 billion at the end of 1945 to $0.3 billion in 1954.

In the next few months I intend to develop questionnaires and procedures for obtaining more comprehensive data from financial institutions than are now available on gross flows of funds into and out of mortgages. An attempt to develop more information on yields and other terms of mortgage lending will also be made. A serious effort will finally be made to develop a further breakdown of the outstanding mortgage debt by type of property, type of lender, and type of borrower, and provide additional information on real estate transactions underlying nonfarm mortgage lending.

SAUL B. KLAMAN

CORPORATE BOND RESEARCH

Revisions of "Corporate Bond Quality and Investor Experience," the second report of the series on corporate bond financing, were substantially completed in 1955. The purpose of this report is twofold: first, to trace movements in the volume of securities offered and outstanding that had various specific characteristics; and second, to examine the experience of investors with securities of different types. It is essentially an analytical volume based on an extensive body of statistical materials compiled by the Corporate Bond Study. The supporting data – together with notes on methods of derivation and suggested uses – will be published as a third report, "Statistical Measures of Corporate Bond Characteristics and Experience." A brief statement of some of the major findings of the study as presented in Volume II was given in last year's annual report. The scope and contents of the two volumes are indicated by the following chapter headings:

VOLUME II

Chapter

- Introduction and Summary of Findings
- 1 Plan of the Study and Problems of Measurement
- 2 Aggregate Experience
- 3 Agency Ratings
- 4 The Legal Lists
- 5 A Market Rating for Corporate Bonds
- 6 Comparative Performance of Rating Systems
- 7 Earnings Coverage and Lien Position
- 8 Size of Issue and Asset Size of Obligor

VOLUME III

- 1 Characteristics of Outstanding Issues
- 2 Characteristics of Offerings and Extinguishments
- 3 Characteristics of Defaulted Issues
- 4 Measures of Experience over Chronological Periods
- 5 Measures of Experience from Offering to Extinguishment
- 6 Measures of Experience on Defaulted Issues

W. BRADDOCK HICKMAN

EXPLORATORY STUDIES IN FINANCE

Exploratory studies in three areas of finance were begun last year with the aid of a grant from the Association of Reserve City Bankers: on lending policies and their bearing on the quality of loans in booms and depressions, on the structure and behavior of interest rates, and on the changing structure of credit and savings facilities. Several members of the staff and a number of consultants from universities, financial institutions, and government agencies collaborated in an effort to determine the needs for further research in these areas and the best methods of attack. Although plans for research projects are still in the formative stage, some preliminary observations on the problems under investigation may be reported.

Quality of credit in booms and depressions. The time seems to be ripe for the provision of new facts about a subject that is close to the heart of the problem of economic instability: the changing quality of credit. Our exploration has uncovered materials that are not being properly exploited and has given us reason to believe that new sources of information can be developed.

A study to consider and devise a system of current reporting on the quality of credit is therefore in order. Such a study should organize and analyze as much information as can be extracted from existing records and develop practicable suggestions for the collection of new information. It would, of course, be imperative to clarify the meaning of "credit quality," compare alternative methods of measurement, and set forth the economic implications of the data in the light of past experience and present-day conditions.

If research is developed along these lines, it should not be confined solely to changes in credit quality during boom periods. Previous studies have shown that the consequences of credit deterioration during booms appear in subsequent depressions, and contribute to their severity. The failure to recognize credit deterioration during a boom may cause a severe shock to business confidence when trouble develops, a sharp contraction in lend-

ers' commitments, and perverse requirements for liquidity by supervisory authorities. Moreover, the apparent losses, charge-offs, and write-downs may not only exaggerate the losses that will eventually be sustained, but also reflect adversely, beyond what subsequent experience will reveal, on the risks attaching to new investment opportunities. Actual and potential developments in both phases need to be set forth and documented if the study's full contribution to the problem of economic instability is to be realized.

Among the analyses that seem most promising are ones on:

1. The changing quality of consumer instalment credit as indicated by loan terms and relevant characteristics of borrowers or their economic circumstances

2. Delinquency, loss, and recovery rates on commercial bank credit in relation to the volume and composition of loan portfolios, valuation reserves, and charge-off policies

3. Examiners' appraisals of loans by commercial banks and other lending institutions: their validity, relation to business conditions, and consequences for cyclical stability

4. The level and trends in financial ratios of individual companies (as indicators of their credit-worthiness), taken in relation to their changing use of credit during booms and depressions

5. The credit files of commercial banks, to determine whether it is feasible to obtain from them periodic summaries reflecting the quality of commercial loans as indicated by lending terms, borrowers' financial status, and so forth

6. Credit ratings by rating agencies, to determine their validity as indicators of the credit-worthiness of individual firms and the feasibility of a summary compilation showing shifts in credit ratings of the business population.

Other projects dealing with the quality of state and municipal security issues, the quality of farm loans, and other credit areas might be useful.

A preliminary paper reviewing some of the results of the exploratory study was presented by Geoffrey Moore at a joint meeting of the American Statistical Association and the American Finance Association in December and was published in *The American Banker*, January 31, 1956. It will appear also in the May issue of the *Journal of Finance*. Another paper, which would develop more fully the implications of previous studies in this field, is contemplated.

Interest rate structure and behavior. The past quarter-century has witnessed dramatic changes in the levels of short-term and long-term interest rates and in the relations between obligations of different maturities and grades with respect to yield and price movement.

These changes in the level and structure of interest rates unsettled various long-held rules of thumb. Because short-term rates had commonly been higher than long-term rates for more than a quarter-century before the Great Depression, many had come to believe that somewhat lower yields on long-term bonds than on short-term paper were "natural." This was sometimes attributed to the willingness of investors to pay something in the form of a lower yield in order to avoid the trouble of repeatedly seeking replacements for their maturing investments. But during the 1930's and 1940's, short-term rates declined so much more than long-term rates that the latter came to be several times the former for obligations of substantially equal quality.

After this type of relationship had persisted for some years, the generalization that interest rates tend to be higher for obligations of longer maturity, became widely accepted as "normal." It was loosely attributed to such factors as the lesser risk of default, the smaller loss in liquidity, and the smaller price risks to which shorter-term obligations are subject. But during the past few years, short-term interest rates have risen more than long-term rates, with the result that a substantial degree of straightening has occurred in the curve of yields to maturity. How can these shifts be explained?

The relationship between yields on high-grade and second-grade bonds also raises questions. Some empirical support, as well as

theoretical rationalization, can be found for the common belief that the spread in yields between high-grade and second-grade bonds tends to widen in periods of business disturbance and uncertainty and to narrow in periods of business prosperity and confidence. But the relationship is not a simple one, and closer study of the facts, particularly for recent years, may bring additional insights. How does the spread behave in response to general changes in interest rates? How has it been affected by the creation of partial substitutes for both high- and second-grade bonds in the form of VA and FHA mortgages?

The relative price behavior of different maturities poses another set of questions. For some purposes the price behavior of money market securities is of greater importance than their absolute or relative yields. For example, certain funds may be channeled into short-term obligations regardless of the availability of higher yields on longer-term issues because the investor desires a high degree of price stability. Yet price sensitivity among obligations of comparable quality is not solely a function of length of maturity, and the question arises as to what other factors should be taken into account.

Still other questions arise concerning lead and lag relationships and differences in the effects of central banking operations upon the movements of various types of interest rates. Because the facts have not been subjected to a sustained careful study, we do not know in detail how differently, as to timing or degree, various types of central banking action affect the different parts of the interest rate structure. There have been times when the effects seemed most immediate and pronounced in the short-term sector, and other times when medium- or long-term bonds displayed the speediest or greatest response.

The truth is that there are such large gaps in our factual knowledge of interest rates and in our understanding of their movements that the paucity of useful and reliable generalizations should not be surprising. It would seem wise, therefore, to plan a series of studies designed to build up a body of organized factual knowledge and understanding. Among the topics around which such studies might be centered are the following:

1. The relative price behavior of debt securities of different maturities
2. The structure of interest rates by markets (as contrasted with maturities) and quality
3. Variations in the effects of central banking operations upon the movements of yields and prices in different parts of the money market
4. Tax influences on interest rates

Some aspects of the latter topic were treated in the recent Occasional Papers by George Lent, *The Ownership of Tax-Exempt Securities, 1913-1953,* and by Lawrence H. Seltzer, *Interest as a Source of Personal Income and Tax Revenue.* Further contributions to the broad field of interest rate structure will be made in the forthcoming books by W. Braddock Hickman, "Corporate Bond Quality and Investor Experience," and by Oskar Morgenstern, "International Financial Transactions and Business Cycles," as well as in a new study of basic yields by David Durand.

Changing structure of facilities for credit and savings. Certain significant aspects of the changes in our financial organization have been described and analyzed in the reports published by our Financial Research Program and by other research groups. A comprehensive view is provided in the forthcoming monograph on "Financial Intermediaries in the Saving and Investment Process in the American Economy, 1900-1952," by Raymond W. Goldsmith, one of our Studies in Capital Formation and Financing. This report sketches the growth, over a fifty-year period, of commercial banks, mutual savings banks, saving and loan associations, insurance companies, pension funds, and other financial institutions. During the past twenty-five years many new governmental credit institutions have entered the scene, and the forthcoming monograph, "Federal Programs of Lending, Loan Insurance, and Loan Guarantees," by R. J. Saulnier,

Neil H. Jacoby, and Harold G. Halcrow, subjects this development to analysis.

While the broad outline of change is clear, we need to know more about the present financial structure, the events that have brought it into being, and the forces it has generated. What changes in financial organization have accompanied the growth of large-scale nonfinancial business corporations with enormous quantities of liquid funds at their disposal? What changes have occurred in the division of responsibility among the several types of financial institutions, and how have these been reflected in their relative rates of growth and in the composition of their assets and the sources of their funds? For each type of financial institution, what has happened to the regional distribution of offices and branches, and to the size of these and of companies as a whole? What role have mergers played in determining these distributions? What shifts have occurred in inter-company relations, as in correspondent banking arrangements?

If we are to understand the financial structure of today and the directions in which further change are tending, we need to come to closer grips also with the causes of these changes. Particularly, we need to know more about the role of government policy, legislation, and regulation.

But government is not the only source of change in the structure of credit and savings facilities. There are forces originating in economic growth and economic development. The shift in income distribution, one of the revolutionary changes of our time, has played a part: this shift has been accompanied by changes in savings habits and in the direction of investment of savings. The growth of life insurance and the rise of pension plans and related personal and social security systems have had significant effects on the absolute and relative volume of "contractual" savings.

The unprecedented level of home ownership – in part because of the spread of the amortization-mortgage – has led to another significant addition to the volume of contractual savings. People have not only increased in numbers all over the country; they have also moved about in large numbers: migration from one region to another and from farm to city and city to suburb has been considerable. This too has meant shifts in financial needs and institutions.

The trend toward family acquisition of more and more durable goods like automobiles and washing machines has had important effects on the volume of consumer instalment credit and personal loans, just as the availability of such credit has helped swell expenditures on these commodities. Improvement in equipment and methods in the offices of financial institutions has reduced costs of operation, and this has helped make possible services not otherwise feasible.

The questions that arise in this area are important and well worth considering for formulation into a research project. Such a project would be an essential complement to our study of the postwar capital markets, and it would also derive much from the results of this study, which has just begun. It would also be closely related to the studies of the structure of interest rates described above. With careful planning, it may become possible to develop a program that will provide a comprehensive description and analysis of the credit and capital markets as a whole.

FUND FLOW ANALYSIS

Revision of the introduction to my manuscript has been completed. I have brought the data up through 1954 both for the Allis-Chalmers Co. and for the Federal Reserve sample of 200 large manufacturing companies, 1940-1954. The various flows based on the Federal Reserve data move nicely parallel with the National Bureau's eighty-four company sample during the overlap years of 1940-1943. The larger number of companies seem to add only a small percentage to the volume of transactions.

I am now revising the chapter on cash, using the National Bureau's indexes of conformity with the business cycle. After that, I shall add a section to the technical chapter showing how and why the "adjustments" were

made in the total asset, working capital, and cash worksheets.

The cyclical pattern of the movement of cash between corporations and the money markets is shown in Chart 3. The broken line reports the net cash received by the corporations from the money market or the net repayments made thereto. In explaining what prompted these transactions, the excess cash payments or receipts for materials, services, capital equipment, and goods sold is shown by the solid line. During the high and rising phase of business activity, with its rapid expansion of earning assets, corporations spend more money than they collect from customers, and so call upon the money market for aid. In the contracting phase, the liquidation of earning assets generates excessive cash which is promptly returned to its source. Both curves, the one for the money market and the one for business transactions, earn perfect scores in the National Bureau's indexes of conformity.

WILSON F. PAYNE

OTHER STUDIES

Four reports were published during 1955 and two are in press:

Urban Mortgage Lending: Comparative Markets and Experience, by J. E. Morton

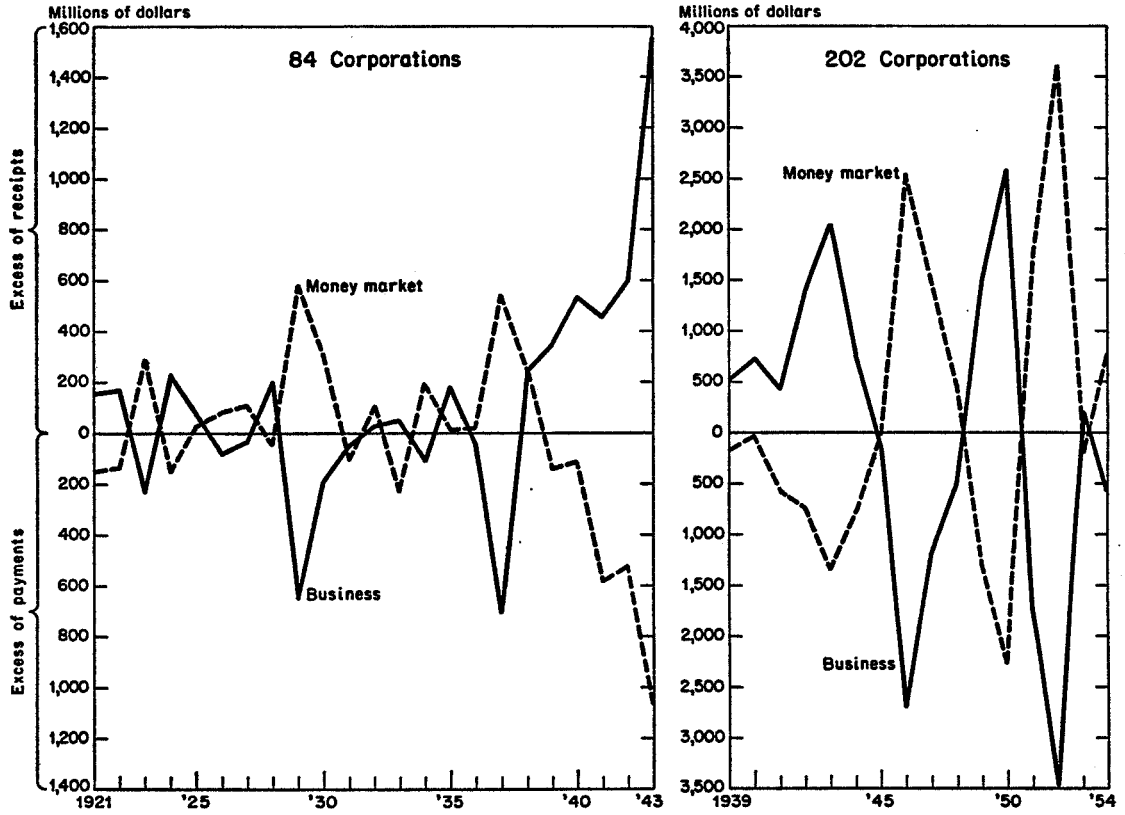
The Ownership of Tax-Exempt Securities, 1913-1953, Occasional Paper 47, by George E. Lent

Agricultural Equipment Financing, Occasional Paper 50, by Howard G. Diesslin

Interest as a Source of Personal Income and Tax Revenue, Occasional Paper 51, by Lawrence H. Seltzer

CHART 3

Flow of Cash on Business and on Money Market Accounts of Large Manufacturing Corporations; 84 for 1921-1943, and 202 for 1939-1954



Source: 84 corporations; "NBER Corporate Financial Data for Studies in Business Finance," mimeographed.
202 corporations; *Federal Reserve Bulletin.*

The Pattern of Financial Asset Ownership: Wisconsin Individuals, 1949, by Thomas R. Atkinson (in press)

Patterns of Farm Financial Structure: A Cross-Section View of Economic and Physical Determinants, by Donald C. Horton (in press)

Raymond W. Goldsmith's "Financial Intermediaries in the Saving and Investment Process in the American Economy, 1900-1952," is being prepared for press.

Four reports will shortly be ready for review by the Board:

"Bank Stock Prices and the Bank Capital Problem," by David Durand

"Corporate Bond Quality and Investor Experience," by W. Braddock Hickman

"Federal Programs of Lending, Loan Insurance, and Loan Guarantees," by R. J. Saulnier, Neil H. Jacoby, and Harold G. Halcrow

"International Financial Transactions and Business Cycles," by Oskar Morgenstern

Wolfgang Stolper's manuscript, "Economic Fluctuations and Urban Real Estate Finance," is being reviewed by the staff. The reference volume, "Statistical Measures of Corporate Bond Characteristics and Experience," by W. Braddock Hickman, is nearing completion.

A preliminary report on certain phases of the study of agricultural credit institutions was prepared by George K. Brinegar.

Other studies in banking and finance are reported in Part Two and in Sections 1 and 2.

5. *Governmental Activity and Finances*

THE INDIVIDUAL INCOME TAX

Occasional Paper 51, *Interest as a Source of Personal Income and Tax Revenue,* has been published. It presents one section of the study of the individual income tax on which I have been engaged for some time. I am now devoting my attention to the relations between personal and taxable income and, more immediately, to the personal exemptions and credits for dependents.

Between 1925 and 1935, the total number of persons who paid income taxes, and their dependents, ranged only between 3 million and 5 million a year, and accounted for only between 2.5 per cent and slightly more than 4 per cent of the country's population. By 1952, they exceeded 100 million and accounted for not far from two-thirds of our total population. This great change was the joint product of statutory reductions in the personal exemptions and the substantial growth and wider diffusion of personal incomes.

In line with other evidences of the rise and wider diffusion of personal incomes in very recent years is that provided by the changed distribution among the different income groups of the dollar amounts of personal exemptions and credits for dependents reported on taxable aggregate returns. Between 1948 (when the law first permitted income splitting between husbands and wives filing joint returns) and 1952, the aggregate amount of these allowances going to taxpayers with adjusted gross income under $3,000 fell by $3.8 billion or 22 per cent; the amount going to those with adjusted gross incomes between $3,000 and $5,000 rose by $4 billion or 18 per cent; and the amount going to taxpayers with adjusted gross incomes between $5,000 and $10,000 rose by $11.8 billion or 137 per cent.

The proportion of the total dollar amount of personal exemptions accounted for by those with gross incomes of less than $3,000 fell from 34 to 21 per cent between 1948 and 1952, and the proportion of the total accounted for by taxable returns with gross incomes of $3,000 to $5,000 fell from 44 to 41 per cent. But the proportion of the total accounted for by those with gross incomes of $5,000 to $10,000 rose from 17 per cent in 1948 to 32 per cent in 1952. This income group accounted for 90 per cent of the entire increase in aggregate personal exemptions in this period. The foregoing figures are all exclusive of exemptions for old age and blindness and exemptions on returns reporting self-employment tax only.

Another phase of the study of the indi-

vidual income tax is reported below by C. Harry Kahn.

LAWRENCE H. SELTZER

Personal Expense Deductions

During the greater part of the past year I have been working on the completion of a study of the personal expense deductions allowed under the individual income tax, a part of which appeared in preliminary form in *Federal Tax Policy for Economic Growth and Stability*.[1] Unlike business expense deductions, these deductions from the tax base are (with some exceptions) associated with the disposition, rather than with the creation, of an individual's income. Unlike the personal exemptions, they apply to a few specific types of expenses rather than being a generalized and neutral per capita allowance. This study thus deals with one aspect of the derivation of the tax base.

Table 9 shows our estimates of the effects of personal deductions and exemptions on the tax base over the period 1918-1952. We start with total adjusted gross income, which is the estimated country-wide total of personal income adjusted to correspond to the currently used tax return concept of income. Personal exemptions have declined over the years in relative importance, and personal deductions have risen somewhat. As recently as 1952, their estimated combined amount has exceeded that of the tax base in every year, but in 1918 the exemptions took up twelve times as much income as the deductions while in 1952 they were only three times as large. These figures reveal two important features in the development of the modern income tax:

1. The amount of income eliminated from the tax base, by statute, within the aggregate that is conceptually designated as the tax base (as opposed to income that lies conceptually outside the tax base by not being part of adjusted gross income) is still very large. While

[1] Joint Committee on the Economic Report, 84th Cong., 1st Sess., November 1955.

TABLE 9

RELATIVE IMPORTANCE OF PERSONAL DEDUCTIONS AND EXEMPTIONS IN ACCOUNTING FOR GAP BETWEEN TOTAL ADJUSTED GROSS INCOME AND TAX BASE, SELECTED YEARS, 1918-1952

	1918	*1926*	*1933*	*1946*	*1951*	*1952*
			(*millions of dollars*)			
1. Total adjusted gross income[a]	49,999	68,676	35,524	155,550	228,547	240,645
2. *less estimated:*						
a. Leakage[b]	2,662	3,785	1,834	19,047	23,219	22,146
b. Deductions[c]	3,093	7,459	3,868	14,761	24,484	26,782
c. Exemptions[c]	36,123	46,287	25,950	55,920	80,737	83,671
3. *equals:* Tax base[d]	8,121	11,145	3,872	65,822	100,107	108,046
			(*per cent*)			
4. Amount removed from tax base by:						
a. Deductions (line 2b ÷ line 1)	6.2	10.7	10.9	9.5	10.7	11.1
b. Exemptions (line 2c ÷ line 1)	72.2	67.4	73.0	36.0	35.3	34.8

[a] Commerce Department's personal income figures adjusted for differences in concept by Joseph A. Pechman, and incorporating changes made by Lawrence H. Seltzer, for years later than 1929. Years prior to 1929: Kuznets' income payments estimates adjusted by Seltzer for differences in concept.

[b] "Leakage" refers to underreporting and statistical errors in estimating. For 1946, 1951 and 1952 our estimates are based on the income reported on all tax returns plus an estimate of the income received by those whose adjusted gross income was less than that stipulated as a filing requirement. For the earlier years no data for this purpose are available to us, and we therefore extrapolated the 1945-1946 relation between leakage and income reported on all returns back to the interwar period.

[c] These figures are in part based on the amounts actually claimed on taxable returns, and in part on ratios revealed on nontaxable returns.

[d] This is the taxable net income as estimated from taxable return data in *Statistics of Income*.

it declined sharply from over 80 per cent in pre-World War II years to about 46 per cent of total adjusted gross income in 1952 after some leakage due to underreporting, we are still left with only 44 per cent of the 1952 total in the actual tax base.

2. The amount of income thus removed from the tax base is less than formerly related to population and family size, and more to certain types of personal expenses and size of income (as the result of the optional standard deductions).

Table 10 repeats the steps taken in Table 9, except that this time we start out with income reported on taxable returns. The tax base figure in line 3 is, of course, the same in both tables. The table shows the remarkable stability over time of the ratio of the tax base to the income of taxpayers. This is largely due to the equally stable ratio of exemptions to taxpayers' income. The latter has varied between 0.32 and 0.38 in the majority of the years between 1918 and 1952.

This finding is somewhat surprising in view of the substantial changes in both the level of incomes and exemptions over this period. However, whenever exemptions are lowered, or national income rises, or both, the exemption-income ratio of the old taxpayers tends to fall, but the new taxpayers who are just entering the taxable group have, on the average, a high exemption-income ratio. Our figures indicate that the entrance of new taxpayers, with high exemption-income ratios, was at most times just sufficient to offset the falling ratios of the old taxpayers. Not that this had to happen, a priori, or that it will necessarily continue to happen. Nevertheless, this observation provides us with a fairly good clue to the income elasticity of the tax, an important element of its built-in flexibility.

We have also attempted to give a quantitative historical account of each of the major deductible items, such as the philanthropic contributions, non-business interest payments, state and local personal taxes, and medical expenses. In 1952, these itemized deductions accounted for slightly more than one-half of the total deductions on taxable returns, the rest being taken in the form of the optional standard deduction. The latter was introduced as a tax simplification measure in 1944. In that year, 63 per cent of the total was taken in the standard form, but since then this figure has declined steadily to its present level of just below 50 per cent.

The reason for this appears twofold:

1. There has been a perceptible upward trend in the major deductions in recent years. In the case of the interest, taxes, and medical

TABLE 10

DEDUCTIONS AND EXEMPTIONS ON TAXABLE RETURNS, SELECTED YEARS, 1918-1952

	1918	*1926*	*1933*	*1946*	*1951*	*1952*
			(*millions of dollars*)			
1. Adjusted gross income	15,223	19,476	7,971	118,721	183,935	197,331
2. *less:*						
a. Deductions	1,330	2,087	1,005	13,245	22,400	24,750
b. Exemptions	5,772	6,244	3,094	39,654	61,428	64,535
3. *equals:* tax base	8,121	11,145	3,872	65,822	100,107	108,046
			(*per cent*)			
4. Adjusted gross income	100.0	100.0	100.0	100.0	100.0	100.0
5. *less:*						
a. Deductions	8.7	10.7	12.6	11.2	12.2	12.5
b. Exemptions	37.9	32.1	38.8	33.4	33.4	32.7
6. *equals:* tax base	53.4	57.2	48.6	55.4	54.4	54.8

Note: The adjusted gross income concept was not introduced until 1944. The figures for prior years are our own estimates based on *Statistics of Income* data.

expense deductions, this growth has also been observed in the underlying expenditure aggregates. For philanthropic contributions, no reliable aggregate series is as yet available.

2. There have been continued, though small, liberalizations in the legal definition of what constitutes allowable personal expense.

It should be noted that the rise in incomes appears to have had little, or no, direct bearing on this development since we find that within the taxable return category, the income subject to the 10 per cent standard deduction has not changed appreciably in relative amount since 1948. Indeed, since 1944, it has risen because of the extension of the upper limit on the standard deduction from $500 to $1,000 in 1948.

C. HARRY KAHN

THE TAX TREATMENT OF STOCKHOLDERS

"The Differential Tax Burden on Stockholders" has been approved by the directors, and is being prepared for publication. The contents of the study are indicated by the chapter titles:

Chapter

1 Introduction
2 The Results for 1950
3 A Summary of Our Findings, 1940-1950
4 Alternative Measures of the Differentials against Net Corporate Earnings and Stockholders
5 The Taxation of Corporate Earnings and Progressivity
6 Some Revenue Aspects of the Differential Taxation of Stockholders
7 The Relief Provisions of the Internal Revenue Code of 1954
8 Summary and Conclusions

DANIEL M. HOLLAND

CITY EXPENDITURES IN THE UNITED STATES

In our study of the factors influencing variations among 462 cities in per capita expenditures on various services, it turned out to be important to take account of differences in the degree to which certain functional responsibilities are divided between the city and other governmental authorities. Accordingly, separate multiple regression analyses were carried out for the cities of California, Massachusetts, and Ohio, and for the forty largest cities whose expenditures for 1953 could be combined with those of their overlying local governments.

The results in each of the four cases reveal a far closer association between the various categories of expenditure studied and population size and density, family income, state aid, and the ratio of employment in manufacturing, trade, and services to population than did the analysis for all 462 cities taken together. While the latter, for example, produced coefficients of multiple determination no higher than .24, only five of thirty-three of the corresponding coefficients for the four subgroups are as low as, or lower than, this value, and others range upwards to .70, after correction for the reduction in the number of degrees of freedom. Similar increases appeared in the regression and elasticity coefficients.

For the forty large-city areas we could not only combine expenditures of the cities and their overlying units of local government, but also test the hypothesis that the lower the ratio of the central city's population to that of its metropolitan area, the higher its per capita expenditures on major functions. A decline in the population ratio implies an increase in the proportion of persons for whom public services must be provided by the city but who are not a part of the city's own population. Our results give strong support to the hypothesis.

Examination of the data for all cities suggested that there is a substantial degree of association between the per capita amounts spent by cities and the nature of the city. Accordingly, the 462 cities were classified into seven groups: core cities of major (population 250,000 and over) and minor (population under 250,000) metropolitan areas, high and low income residential suburbs, industrial suburbs, cities not part of a "standard" metropolitan area, and major resort cities. Differences in expenditures among groups of cities classi-

fied in this fashion were statistically significant.

The results of our analysis, therefore, suggest strongly that a substantial part of the variance in expenditures "unexplained" by the independent variables in the study of the 462 cities may be due to differences in (1) the distribution of functional responsibilities among local governments from state to state, (2) the ratio of city to metropolitan area populations, and (3) the nature of the city with respect to its classification according to the criteria indicated above.

HARVEY E. BRAZER

OTHER STUDIES

The varied activities of government are reflected in the three reports published during 1955 and the two in press:

The Ownership of Tax-Exempt Securities, 1913-1953, Occasional Paper 47, by George E. Lent

A Century and a Half of Federal Expenditures, Occasional Paper 48, by M. Slade Kendrick

Minimum Price Fixing in the Bituminous Coal Industry, by Waldo E. Fisher and Charles M. James

The Growth of Public Employment in Great Britain, by Moses Abramovitz and Vera Eliasberg (in press)

Fiscal-Year Reporting for Corporate Income Tax, Technical Paper 11, by W. L. Crum (in press)

"Federal Programs of Lending, Loan Insurance, and Loan Guarantees," by R. J. Saulnier, Neil H. Jacoby, and Harold G. Halcrow will shortly be ready for review by the Board. John Firestone's manuscript on the cyclical behavior of federal revenues and expenditures since 1879 is being revised.

The statistical work on the monograph on the growth of British governmental expenditures, 1890-1950, by Alan T. Peacock of the London School of Economics, is largely completed. Several chapters are in draft form.

Morris Copeland's report on his study of governmental financial capital requirements is in Section 2, and Roland I. Robinson's report on his study of the markets for government securities is in Section 4. Two new studies are reported briefly in Part Two. One is a broad exploration of the needs for research on the economic effects of public and private pension programs; the other is concerned with the analysis of newly available data on state and local government expenditures.

6. *International Economic Relations and Foreign Economies*

ECONOMIC GROWTH OF THE SOVIET UNION

The object of this study, begun in 1954 under a grant from the Rockefeller Foundation, is to set forth and analyze the evidence bearing on the question: How rapidly has the Soviet economy been growing in the past thirty years? The study was undertaken in full recognition of the inherent difficulty of arriving at an answer to this question and of the special difficulties attaching to the securing of reliable information.

In addition to the work reported on separately, studies are also being made of Soviet housing construction, labor force and population, and standard of living. Work in these areas is being done by Leo Grebler, Carolyn Shilling, Harold Wool, and Nancy Baster.

Industrial Production

The task of assembling annual figures on output and adjusting them to take account of the absorption of "small-scale" industry has been essentially completed, and some preliminary analysis has been started.

A cross-sectional view of the output series is given in Table 11. The count of series should not be taken too literally since there is some overlapping. In addition, a large number of subsidiary series covering relatively short periods, or containing pronounced gaps, are not included in the table. The best coverage is for 1928 through 1937 and for industrial materials. Here again a word of caution is called for, however, since almost all series contain minor gaps in the periods covered.

The decline in information for recent years results from a general Soviet policy of withholding unfavorable statistics from public view. Begun on a large scale in 1936, this policy was intensified during World War II and the postwar years. It has been carried out in three ways: (1) by publishing virtually no data for slow-growing or declining industries, (2) by omitting data for years of poor performance in other industries, and (3) by couching statistical reports in ambiguous and roundabout terms. Some of our series for the postwar years, for instance, exist solely in the form of annual percentage changes.

The net effect is that data on output, when not actually hidden by an impenetrable curtain, are at least obscured by a heavy veil. No series is known as well as one expects to know the nature of data for the United States. At the same time, internal evidence suggests that what data there are rest on a foundation of facts, not pure fiction. The primary difficulty is getting to the foundation.

These qualifications apply more strongly to postwar years than to the interwar period. The more complete data for the interwar period are fairly adequate for showing growth trends through 1937 or 1940, though even here there are special problems because of the changing frontiers of industry. It must also be said that the data for recent years, though sparse by Western standards, do cover a number of important products, such as steel, coal, petroleum, electric power, and cement. For a number of reasons, a major part of our analysis will focus on growth trends of such commodities. For some commodities, the series extend back to 1880 or 1870, thus making it possible to compare Soviet trends with those in Czarist days.

The information given out for recent years paints a picture of an economy where output always rises and never falls. The published sample of annual data has been carefully sifted by Soviet authorities to exclude almost all downward movements in output as well as all persistently slow upward movements. Though the upward bias of the resulting sample is undoubtedly substantial, it is very difficult to get a concrete measure of it.

For a few series, it has been possible to find out, through roundabout methods, the extent of declines in output in years when no data were published. These declines seem to have

TABLE 11

NUMBER OF SOVIET OUTPUT SERIES COMPILED BY INDUSTRIAL CATEGORY, 1913-1954

	Number of Series for:				*Number of series covering*
	1913	*1928 and 1937*	*1940*	*1954*	*1913-1954*
All categories	106	147	94	64	43
Industrial materials, total	72	88	52	26	24
Ferrous metals	14	15	11	3	3
Nonferrous metals	9	11	3	3	3
Electricity and fuel	6	7	6	5	5
Chemicals	13	21	11	8	7
Construction materials	21	25	19	7	6
Other materials	9	9	2		
Producer durables, total	11	25	14	11	3
Transportation equipment	6	10	3	2	1
Agricultural equipment		6	6	5	
Machinery	5	9	5	4	2
Consumer goods, total	23	37	28	27	16
Food and allied products	13	17	12	13	10
Clothing	10	13	10	7	6
Durables		7	6	7	

amounted to as much as 20 to 25 per cent in the case of certain producer durables in 1951 and 1952. We are studying ways of indicating the bias caused by this sporadic omission of unfavorable information. There is no simple way to deal with the bias created by the consistent omission of slow-growing industries. One approach is to see how the picture of United States growth changes when the slow-growing industries are ignored, and also when all declines in output are ignored. Clearly, there are serious dangers in moving from published postwar Soviet data to aggregate measures of industrial production.

Despite these general shortcomings of the data and other more specific ones yet to be mentioned, two tentative conclusions seem clear:

1. There seems to be a general tendency, somewhat less marked in the postwar than in the interwar years, for the output of individual products to show a progressive slowing down in the annual rate of growth. The Soviet economy does not seem to differ in this respect from the American and other economies. For some products, retardation is partly obscured because the product is so broadly defined that new and technically different commodities are automatically incorporated into the existing series. For example, "silk fabrics" now include the output of fabrics made from artificial fibers as well as from silk. There are also genuine exceptions to the rule, where there is either no apparent retardation or even apparent acceleration. But these exceptions do not seem to be more numerous than in the United States or to be significantly different in nature. Electric power is a case in point, where growth seems to be proceeding at a rather steady pace; this also seems to be true for the United States.

2. There seems to be a "growth cycle" in the interwar years, coinciding more or less with the "Five-Year Plans." The annual rate of growth in output seems to rise early in the planning period, to reach a peak about midway, and fall to a trough at the end. This pattern shows up in the majority of individual commodities for which we have data. The pattern is somewhat altered in the postwar years, but it is too early to tell whether this reflects a fundamental change in growth trends or simply the peculiarity of postwar recovery and of the biased sample of data.

We are exploring methods of comparing Soviet industrial growth with growth in the United States. One method will show Soviet output as a percentage of United States output at various dates; another will compare Soviet and United States growth rates over the same and other relevant periods; a third will indicate the number of years lag of Soviet output behind United States output at various dates.

Properly qualified, the last method may produce some useful comparisons between the growth of Soviet and United States output at similar stages of development. For instance, Soviet output of steel ingots in 1913 (in the interwar territory) was the same as that which had been reached in the United States in 1890, twenty-three years earlier. In 1928, Soviet output lagged thirty-six years; in 1940, thirty-five years; and in 1954, thirty-eight years. The recently announced Sixth Five-Year Plan would, if realized, reduce the lag behind United States steel production to nineteen years. This would be a sharp reversal of the trend toward an increasing lag; it would make the lag four years smaller than in 1913.

Measures of broad aggregates of industrial production will be approached in steps through the construction of progressively more inclusive indexes. The first will be an index of energy output based on coal equivalents. Work on this index is essentially completed. Next will be an index of consumption of industrial materials, weighted by several alternative methods. Finally, several broad indexes of industrial production may be constructed. These broad indexes are not viewed as the ultimate goal or as the crowning synthesis of all other work, but rather as another way of describing growth.

As was stressed in last year's report, index numbers are doubly treacherous when used to summarize Soviet industrial growth: first because reliable and meaningful weights are so hard to obtain, and second because the Soviet

era has been characterized by radical changes in the structure of industry, administrative questions entirely aside. It is worth emphasizing again the importance of analyzing those structural changes and of disentangling them from the process of growth. In particular, the transformation of Russian industry from the handicraft stage, where this country was before the Civil War, into the factory stage requires special attention.

Among those participating in the work on the industrial sector last year were Alexander Erlich, Israel Borenstein, and Adam Kaufman.

G. WARREN NUTTER

Agricultural Production

During 1955 most of the work on the agricultural sector was devoted to (1) compiling and checking output data and correlative information on crops and livestock with particular emphasis on the period since 1945, (2) assembling information on the prices received by agricultural producers during the period 1925-1945, and (3) compiling and organizing the fragmentary data available for certain years on production costs, labor inputs, and unit labor requirements. Some preliminary and rather experimental computations of measures of agricultural output and of related index numbers for a few benchmark dates were made.

The volume of statistical information on agricultural output published in the Soviet Union declined steadily after 1935. Through 1935, annual output data for some twenty-six different crops could be readily located in Soviet sources. By 1937, the number dropped to nineteen; by 1940, to fourteen. For the period 1950-1955, output figures for only five individual crops and for the aggregate category "grains" were uncovered or derived from percentage changes reported in Soviet publications. For livestock products, the output of major items (major types of meat, milk, eggs, and wool) was directly available or could be estimated annually for the period 1921-1939 or -1941, and for 1950-1955.

The volume of physical output data and of correlative information on sown area and livestock numbers is sufficient to trace with reasonable assurance and in reasonable detail the course of agricultural output to the beginning of World War II. The postwar data are too sparse to do more than to sketch in roughly the level of gross output for a few years. While the crops and products for which output data are available for the 1950's may account for as much as half the fixed-price value of total agricultural output in that period (they do so for the Soviet measure of agricultural production in 1940 valued in 1926/1927 prices), there is the obvious danger of imparting a substantial bias to the measure of output by basing it on the available data without some adjustment for the selectivity of coverage.

Perhaps a more serious difficulty than the sparsity and selectivity of data for the more recent years is the lack of comparability in published Soviet output data for crops. The shift from utilizable or harvested production as the concept of output to the "biological" concept (abandoned in 1954) occurred in several steps, which cannot be precisely set off. In the absence of detailed data, adjustments to restore some semblance of comparability are bound to be rough.

Yet the problem cannot be side-stepped, for fragmentary evidence indicates that the total size of the required adjustments is quite substantial (the reduction of 20 to 25 per cent in the official figures for grain production, at least after 1934, of 5 to 20 per cent for cotton production beginning with 1940, of about 15 per cent for sugar beet output in 1950 and 1951, to cite a few examples). The compromise solution that I have finally adopted is to estimate reasonable upper and lower bounds to the required adjustments and to carry along in subsequent analysis two variants of basic crop output series.

The choice of weights for an aggregate index of Soviet agricultural output raises interesting conceptual questions. The testable alternatives, however, are limited:

1. Price weights reflecting precollectivization free market valuation (1926/1927 Soviet prices or the like)

2. Average "realized" prices for a more recent period which reflect both planners' valuations and free market (collective farm markets) pricing
3. Unit labor input weights reflecting the allocation of the major input and unaffected by arbitrary pricing

Preliminary computations reveal a perceptible but generally moderate effect on the measure of agricultural output of markedly different weights. The use of postcollectivization average "realized" prices (1935) or unit labor inputs (1937) as weights in place of 1926/1927 prices reduces the level of the index (1926 = 100) because of the relatively greater weight imparted to the livestock component, but never by over 10 per cent.

The next step is to prepare a manuscript giving the documented basic output for crops and livestock, a description of the statistical estimating procedures used in the USSR, an analysis of Soviet measures of total agricultural output, and a set of aggregate output computations of our own employing price and labor input weights. Another manuscript in preparation will give the basic price materials and trace the major changes in the structure of agricultural producer prices. This compilation in conjunction with other data will provide a better basis than heretofore available for the estimation of income accruing to agriculture in the USSR.

GEORGE KUZNETS

Transportation

We have been studying traffic and operating statistics intensively to gain a more complete understanding of their nature because of their significance for the appraisal of general economic growth and their possible use as a rough check upon results in the industrial and agricultural sectors. As a close relationship between production and shipments may be expected in many segments of the industrial economy, and as production data may be based upon shipments data in a number of instances, an understanding of the latter assumes considerable importance. Here the ground is, unfortunately, quite treacherous.

The data on water transportation, both inland and coastwise, have been assembled, although not without a good deal of trouble. Their reliability is low, but although this has long been recognized by analysts in the Soviet Union, little progress has been made in correcting the deficiencies in reporting. Water transport, however, contributes only about 8 per cent of total ton kilometers in most years. Pipe line and motor transport are of such scant importance that we have relied primarily upon the investigations of other students brought down to the present by our own investigation.

In all postwar years, about 90 per cent of all intercity ton kilometers in freight service was produced by the railroads. Hence major emphasis may be placed upon this form of transportation. It also appears that, while the traffic volume of Soviet railroads approaches that of the United States railroads, the volume of total United States intercity freight traffic in ton kilometers has been more than double Soviet volume in recent years. This is true even though the average haul in the Soviet Union is greater than in the United States. Statistics of total intercity transportation in the United States before 1939 are fragmentary, hence comparisons of earlier growth will have to be made largely between the respective railroad systems. Soviet railway growth in the postwar period has been great, but it parallels earlier phases of American railway growth during the period of intensive development succeeding the era of territorial expansion.

The appraisal of rail traffic and of rail operations is substantially complete and, for the most part, is in first draft. It appears to afford a reasonable explanation of the Soviet railway performance, including particularly an approach to an understanding of key operating indexes. It seems likely that tonnage originated and reported ton kilometers are overstated and that the freight car stock is understated. In consequence, car turnaround (the time it takes a freight car to complete a journey, including the time elapsed from placing for one loading to placing for the next loading) is presented

in a more favorable light than the facts will support.

It has not, however, been possible to secure a quantitative measure of the degree of inaccuracy. No railway system known to this writer is characterized by such looseness of reporting or such glaring absence of methods of internal accounting and statistical control. My conclusion is that the Soviet railway system represents an investment larger than the statistics reflect, while its traffic performance is somewhat less. All major indexes of the efficiency of railway operations, therefore, tend to be presented at overoptimistic levels. These conclusions should not, however, blind us to the fact that the Soviet railway system exhibits both great strength and considerable flexibility although it is far from a modern system by Western standards.

The major remaining task is to tie together the reported and estimated performance of the several types of transportation and to contrast the results with the more familiar pattern in the United States. This phase of the work is now fully under way.

ERNEST W. WILLIAMS, JR.

STRUCTURE OF WORLD TRADE AND PAYMENTS

Progress during 1955 on the broad study of the flow of goods, services, claims, and money between world areas, made possible by a grant from The Ford Foundation, was reflected in several papers given or circulated during the year.

The study of payments accounts. Working with Walther Michael on country payments accounts, I was able in November to give preliminary estimates for the gross and net value of goods and services transactions between world areas in 1951, the amounts financed by private and official transfers, and the remainder to the Subcommittee on Foreign Economic Policy of the Joint Committee on the Economic Report. Although net services transactions between areas showed a quite different pattern, that for net goods *and* services was found to be much the same as for goods alone, namely with the sterling area in deficit to each of three other areas and balanced with Latin America, the non-sterling area in deficit to each of the other three, the "Other" area[1] in deficit to Latin America and the United States and Canada,[2] Latin America in deficit to the United States, and the United States and Canada in surplus with the four other areas. Because of the large official transfers from the United States, however, the pattern of net balances after taking account of gifts displayed a reversal of direction of balances, with the United States in net deficit with both nonsterling European Payments Union (EPU) countries and Other.

Tentative calculations I have made recently of capital movements between areas indicate that the large extension of credit to the sterling area by the nonsterling countries in EPU more than covered the sterling area deficit on goods and services account, so that the balance between these major parts of EPU financed by gold sales, multilateral settlements, and "error" went the other way. Finally, when I introduced some guesses on where $400 million of gold disappeared and allowed for large gold sales by the sterling area from new production and reserves, the pattern of net balances financed by multilateral settlements and error displayed further modifications.

Chart 4 shows for the first time the patterns of net balances between world areas for a period of time (1951) at the four levels of inclusiveness:

1. Net goods and services = net financed by transfers, capital, gold, multilateral settlements and error
2. Net goods and services and transfers = net financed by capital, gold, multilateral settlements and error
3. Net goods and services, transfers, and capital = net financed by gold, multilateral settlements and error

[1] "Other" includes all Eastern Hemisphere countries not clearing through the European Payments Union.
[2] Including international organizations located in the United States.

4. Net goods and services, transfers, capital, and gold = net financed by multilateral settlements and error

We see the interrelationships between the flow of goods and services, claims, and money among five broad divisions of the world within the framework of a closed (i.e. complete) system of accounts and have some sense of the accuracy of the estimates. I have considerable confidence that the *direction* of the nets is properly stated except when the balance is under $50 million, and in these cases approximate balance is indicated. I have some confidence that the order of magnitude of the interarea balances is properly given – with more confidence attaching to the nets in (1) and (2) than in (3) and still less attaching to those in (4) (because of uncertainty about interarea gold transactions). I also have some indication as to the likely direction of the errors involved and the modifications in the patterns middleman activities produce.

By further work on the 1951 accounts we may be able to improve the estimates by taking a different approach to the selection of figures for the matrix. I would also like to elaborate the five-by-five matrix into one distinguishing the United States from Canada, and European

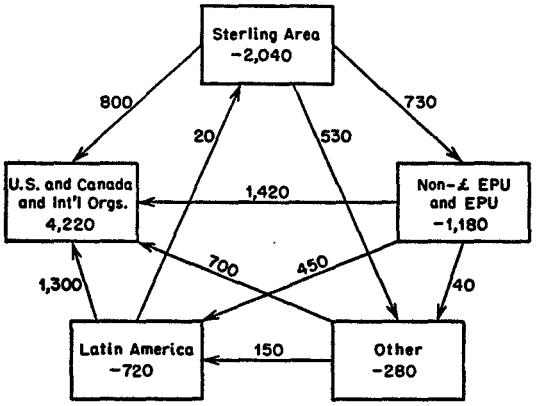
CHART 4

The Pattern of Net Transactions between World Areas in 1951

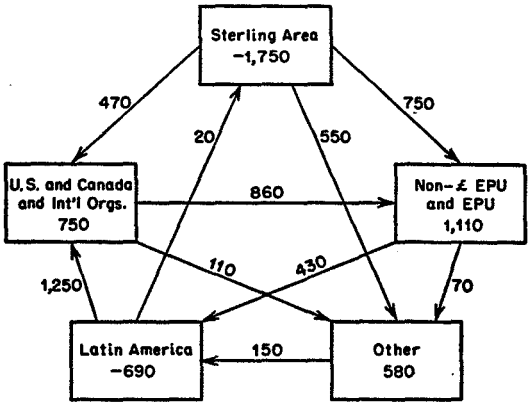
(an arrow indicates the direction of net payments or debits; the amount shown under an area's name is its net balance with the world)

(dollars in millions)

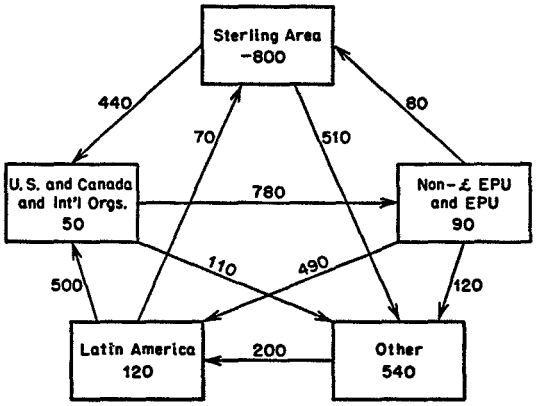
1. Net Goods and Services



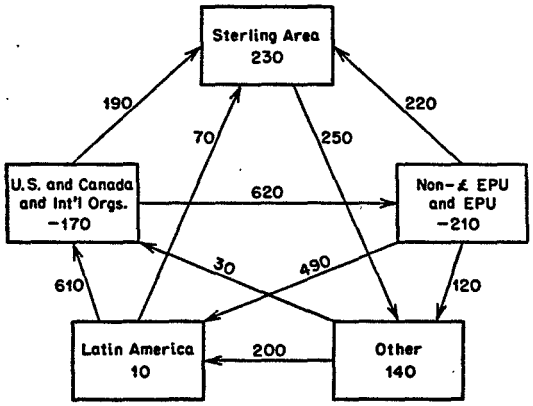
2. Net Goods, Services, and Transfers



3. Net Goods, Services, Transfers, and Capital



4. Net Goods, Services, Transfers, Capital, and Gold



metropolitan areas from associated territories. Progress in these directions was incorporated in a paper for the Universities-National Bureau Committee conference on international economics in April 1956.

The over-all "error" indicated in (4) for each area is not a true measure of the uncertainty attaching to the totals of the several types of transactions by each area with the world. But it represents a minimum emerging from offsetting of errors in the totals for the different transactions accounts. Our audit of each type of transaction as a separate inter-area matrix indicates a substantial amount of divergence between total debits and credits of all countries for the more important categories of goods, services, and transfers. Excessive credits for merchandise and miscellaneous services offset in part the greater excessive debits for other services and transfers. The excess of debits on all current accounts and transfers indicates an underreporting of current credits, notably revenue of the "refugee fleets" and of reinvested earnings on foreign investment. Both omissions imply an underreporting of capital or gold flows.

Because of the generally better reporting of debits, I made up the matrix of goods, services, and transfers for 1951 mainly from reports or estimates of debits.

Our audit of trial-run matrixes and total debits and credits of the different transactions revealed a number of deficiencies and inconsistencies in country reporting of other accounts than merchandise and transportation. These we brought to the attention of the International Monetary Fund officials concerned in a memorandum commenting on proposals to revise their *Balance of Payments Manual.*

Considerable progress was made by Walther Michael and James Griffin in compiling data on country transactions in 1950, 1952, and 1953 similar to those on 1951 we have been studying. By the end of the year merchandise and transportation transactions were in hand, and it is planned to complete this stage of the work in the first part of 1956. In the course of 1956 we plan to have figures like those given for 1951 for the four years 1950-1954 and be able to observe the stability or shifting character of the patterns in the figure from year to year.

The study of merchandise trade. In his study of the record of merchandise trade, Robert Lichtenberg focused this year on the analysis of the role of the middleman in world trade. He reported his progress in a paper delivered to the American Statistical Association at the annual meeting in December.

Lichtenberg examined data of seven countries which report imports both by country of production and by country of purchase. From these records, and from supplementary material on other countries, he found the bulk of world trade to be *direct,* but that in 1952 middlemen mainly supplied more or less refined foods and materials to the seven countries.

Lichtenberg concluded that:

1. Using trade and payments records to assess the interregional financial position of countries results in some serious distortions.

2. Middlemen make a substantial contribution to the foreign exchange position of some countries both directly and through the support they lend to complementary services.

3. They play a major role in linking the economies of many underdeveloped countries to the world economy.

4. Their activities introduce considerable flexibility into bilateral and regional payments agreements by substituting commodity arbitrage for currency arbitrage, and they are a factor tending to push sterling and, hence, other currencies toward convertibility.

Lichtenberg was not able to incorporate in his paper the results of an analysis of the two-valued record we have compiled for 1951 of trade between countries in some twenty-odd commodities defined by three-digit Standard International Trade Classification (SITC) codes although he did scrutinize the record for coffee and rubber. It is evident from these instances and from Dwyer's more searching study of the petroleum trade that to understand and report correctly the record of merchandise and transactions in the most

homogeneous, standardized goods in which middlemen mainly trade, one must study the enterprise structure of international markets, commodity by commodity. We hope it will be possible to make substantial progress along this line in 1956 for the twenty items, emerging with an indication of the extent of the adjustments to the record required for the twenty as a group and, of course, with a more profound and intimate knowledge of the conduct of international trade.

The program of compiling data on trade in particular commodities for a recent period was drastically curtailed during 1955 to allow more time for the analysis of data already gathered. By the end of the year we had completed the compilation for 1951 and had identified trade between countries in three-digit SITC codes (from the export side only) amounting to over $55 billion out of the total of $76 billion. Another $13 billion is identified by commodity as an export to some unidentified destination. Thus we know from the export side the commodity composition, according to the SITC code, of almost 90 per cent of world trade, and for almost 80 per cent of this 90 per cent we know the country of destination. In addition, we know from the import side the composition and country-to-country detail for part of the remaining 10 per cent, consisting of trades like Thai rice not reported from the export side. For some twenty-odd three-digit SITC codes representing more than a third of world trade, we also have a record from the importers' side of quantities and values imported from particular sources in general accounting for about 75 to 80 per cent of world trade in those items.

We plan to study this selected record of matching importers' and exporters' records for the light it sheds upon differences in recording practice (especially valuation, direction, and timing) and hence upon differences in accounting for interarea merchandise transactions. We have made a start on extending the two-valued compilation for the twenty-odd items into 1952, but owing to the diversion of statistical assistance to analytical work involved in the analysis of middlemen transactions, this work has not been completed. In 1956 we expect to put the compilation for 1951 into publishable form.

Other studies. In connection with her work on adjusting merchandise payments accounts from c.i.f. to f.o.b., Carmellah Moneta undertook during the year to analyze the factors determining the size of the c.i.f.-f.o.b. adjustment. The study focused on the variation in freight rates, unit values, and freight factors characterizing German imports in 1951. It appears that the proportion of freight in c.i.f. value varies greatly by SITC commodity groups and within a group somewhat with distance. More particularly, Mrs. Moneta finds for Germany in 1951 that the proportion (F_i) of the c.i.f. value of a commodity which is freight was related to its unit value (X_i) as follows:

$$F_i = a\, X_i^{-.75};\ 2 < a < 6.$$

The factor a represents the effect of distance and varies within the range 2 to 6; the exponent carries the effect of variation in bulkiness (measured by unit value) between commodities and is observed to vary greatly: from .0030 for textile fabrics to .1375 for ores. She concluded that the differentiation between freight factors of imports of the same commodity from different countries is significant only when bulky commodities (i.e. low-valued ones) are considered. It follows that the failure to identify separate freight factors on bulky items and distinguish between different sources for them in a calculation of the over-all freight bill (e.g. Viner's well-known calculation of Canadian freights in 1907) may result in substantial percentage error.

The study of petroleum transactions between world areas which Cornelius Dwyer is carrying on and the study of transportation transactions which Herman Karreman is responsible for are reported below.

HERBERT B. WOOLLEY

Petroleum Transactions

I presented a paper before the American Statistical Association annual meeting in December entitled "The Oil Trade in the Interna-

tional Balance of Payments in 1951," based upon data obtained from the customs records of seventy-seven importing countries and sixteen exporting countries.

The landed value of free world oil trade – defined as imports of crude oil for refining and of refined products for consumption but excluding re-exports and transit trade – was estimated at $7,260 million, about 9 per cent of all free world trade. United States oil companies sold 57 per cent of this total, British and British-Dutch, 39 per cent, and other companies, 4 per cent.

The net receipts of the United States from international oil activities were estimated at $1,790 million, the balance remaining after the deduction of dividends and payments for imports and foreign flag tankers from receipts of oil, merchandise exports to oil source countries, tanker freight, and investment earnings. Foreign exchange receipts are overstated by the inclusion of an unknown but large quantity of oil delivered to American armed forces in Korea and elsewhere. They are understated by the exclusion of sales of services (including those of oil company employees) to the oil source countries.

The paper also provided estimates of the major elements in the United Kingdom's balance of payments on petroleum account, most of the components of which are concealed in a single miscellaneous figure. United Kingdom receipts from exports, tanker freight, merchandise exports to oil source countries, and investment earnings were calculated at $610 million more than payments for imports, tankers, and dividends. These dividends, to the Netherlands from the earnings of the Royal-Dutch–Shell Group, were considerably smaller than the Netherlands' equity in those earnings, the difference representing an increase in the Netherlands' investment in the United Kingdom (or, looking at it another way, in the different countries where the Group operates). Some of the estimated receipts represented deliveries to United Kingdom armed forces – an overstatement of receipts more than counterbalanced by the excluded sales of services to oil source countries.

The basic figures consisted of f.o.b., freight, and c.i.f. value, and of quantities, for trade in nine categories of crude oil and petroleum products for each importer and each exporter, as reported by one or both parties to the transaction. Freight costs were estimated, in detail, and the missing element, either f.o.b. value or c.i.f. value, calculated therefrom. I believe that the resulting trade and freight figures have a high degree of accuracy although, like all statistics, they can still be improved.

CORNELIUS DWYER

Transportation and Marine Insurance

Most of our work in 1955 went into an effort to assess the amount of data and number of calculations needed to estimate carefully the total amount of freight paid by each country for the transportation of dry cargo from the record of goods moved and freight rates charged. Robert Lichtenberg's compilation for 1951 provided a starting point but, because it was designed to account for a large proportion of world trade by value, rather than by quantity, his selection required considerable supplementation.

We found that a selection of approximately 2,700 movements of particular commodities between pairs of countries (at the five-digit SITC or even more detailed level) would cover about 75 per cent of the tonnage of all dry cargo exported by free countries in 1951; this results from the heavy tonnages of coal, grain, ores, forest products, and fertilizers. A summary is given in Table 12.

The 75 per cent coverage will produce a fairly good estimate of the dry cargo freight bill, provided a sufficient number of freight rates can be secured. The total number of freight rates involved and its distribution by area is given in Table 13. By the end of the summer of 1955, practically all the information we needed on quantities of commodities imported in 1951 had been collected, and of some of the imports in other years.

Early in the summer, I sent letters to a number of European shipping conferences asking them to supply data on the freights charged on

TABLE 12

WORLD SEA-BORNE EXTERNAL TRADE OF DRY CARGO IN 1951

EXPORTING AREA	TOTAL NON-CONTIGUOUS (1)	SELECTED EXPORTS TO: ALL COUNTRIES (2)	NON-CTS COUNTRIES (3)	CTS COUNTRIES All (4)	CTS COUNTRIES U. S. (5)	CTS COUNTRIES Other (6)	COVERAGE (2 ÷ 1) (7)
	(*millions of metric tons*)						(*per cent*)
United States	68	57	26	31	—	31	84
Other CTS	124	86	33	53	7	46	69
All CTS	192	143	59	84	7	77	74
Non-CTS	103	79	22	57	17	40	76
All countries	295	222	81	141	24	117	75

Note: CTS countries are those for which data are published by the United Nations in *Commodity Trade Statistics.*

TABLE 13

NUMBER OF FREIGHT RATES TO BE COLLECTED

EXPORTING AREA	IMPORTING AREA: ALL COUNTRIES	NON-CTS COUNTRIES	CTS COUNTRIES All	CTS COUNTRIES United States	CTS COUNTRIES Other
United States	258	156	102	—	102
Other CTS	1,401	817	584	94	490
All CTS	1,659	973	686	94	592
Non-CTS	1,006	375	631	119	512
All countries	2,665	1,348	1,317	213	1,104

Note: For explanation of CTS, see note to Table 12.

the most important commodities carried by their members on different runs to and from Europe as well as between non-European countries; the replies were disappointing. However, from other sources, notably the United States Maritime Commission, tanker brokers in New York City, and other sources, we have been able to assemble a considerable amount of information on freight rates. We see some prospects for securing more information on them.

Our general impression is that we shall have sufficient information to enable a careful estimate to be made of the amount of freight paid by each country for the transportation of imported dry cargo. The tanker freight bill has already been computed in cooperation with Cornelius Dwyer.

Before beginning the computation of the dry cargo freight bill, however, I have been exploring more fully the data on transportation transactions Walter Michael has now compiled for 1950 to 1953, which will enter into the matrix of world trade and payments. As an immediate contribution, I was able to provide rough estimates of the unreported transactions of the Panama, Honduras, and Liberia fleets as well as of the United Kingdom tanker fleet and of the distribution of freight payments by flag of vessel; Herbert B. Woolley used these estimates in preparing the tables presented to the Subcommittee on Foreign Economic Policy. I employed this material in a paper I presented at the conference on international economics in April; it aimed to give an idea of the freight amounts paid and received in 1950 to 1953, in total and by area.

HERMAN F. KARREMAN

CYCLES IN FOREIGN TRADE

Our analysis of the American and British trade balances, 1880 to 1954, has been completed and the results set forth in a paper which has been submitted to the staff. From this report, I mention here only some of the findings about the British balance before World War I.

Our object is to answer such questions as: Has the British trade balance fluctuated in cycles? If so, what was the relation of balance cycles to British business cycles and to world trade cycles? Did the British balance, like the American, decline in business expansions and rise in contractions? Did its turns precede or follow those in general business?

Contrary to the views of some economists, we find that the British balance did fluctuate cyclically and that its cycles were closely related to cycles in the British economy. In the interwar period this relation was of the same type as that of the American trade balance to American business cycles. The British balance fell each time when business expanded and rose when it contracted. Though the regularity with which this pattern was repeated may be surprising, its shape is not. Most economists would expect imports to rise more in business expansions and fall more in contractions than exports.

But the curious fact about the British trade balance is that, contrary to such expectations, it rose and fell regularly *with* British business cycles between 1880 and 1914 and reversed this behavior only after World War I. This, of course, contradicts the recent application of findings for the interwar period to the earlier years. It also contradicts pre-1914 theories about effects of British cycles on other countries that assume inverse movements of the British balance.

The contrast between the American and British balance movements, 1880 to 1914, is most striking around business cycle peaks. Both balances move with amazing regularity during the last stages of business expansions and the first of contractions. But while the American balance fell 9 times out of 10 before, and rose 8 times after, business peaks, the British balance in the same period *rose* before, and fell sharply after, each of the five British business peaks.

The contrast between the patterns of British and American trade balances seems to result from the difference in the impact of business cycles in the two countries on their foreign trade. More particularly, the difference seems to lie mainly in the behavior of exports shortly before, and of imports immediately after, business cycle peaks. In the United States, late expansion was a phase when export values rose only slightly, or even fell, despite firm or rising prices because of shrinking quantities. In Britain, however, export values rose on the average more in the second, than in the first, half of expansions. Usually prices rose, often sharply, and quantities sold also increased, though more slowly than in the earlier stages of expansion.

The contrast between American and British imports at the beginning of business contractions is even sharper. American imports fell immediately after business peaks, British imports continued to rise sometimes even at an accelerated rate. Various explanations of the different reactions of British and American foreign trade to business cycles suggest themselves. They will be explained with the help of the forthcoming price and quantity indexes (see Robert E. Lipsey's report, below).

The positive conformity of the British balance means that the effects of the balance on the British economy must have been largely destabilizing in this period. Balance movements facilitated credit expansion in prosperity and contributed to credit contraction in depression. The role of the balance was thus the reverse of its role in later years, and of that of the American trade balance.

How large these effects of balance changes were in relation to other factors is difficult to estimate. They may have been insignificant in view of the fact that the variations in the trade balance were, on the average, about twice as large as the variations in the monetary reserves of the Bank of England.

As regards the transmission of British business cycles to foreign countries through the trade balance, our findings do not support the

view that British adjustment was at the expense of foreign countries before 1914. On the contrary, the decline of the British balance in British depressions must have helped to sustain foreign economies. This is again in sharp contrast to the unfavorable effects on foreign countries of British balance cycles in later years and of American balance cycles.

ILSE MINTZ

INDEXES OF AMERICAN FOREIGN TRADE

We have completed the collection of quarterly value data for United States imports by economic classes and commodity groups, 1879-1923, and expect to begin the computation of the price, quantity, and value indexes shortly. As reported last year, the calculation of quarterly price, quantity, and value indexes for exports has been completed.

One new group of series has been completed: a set of quarterly price indexes, covering the years 1924-1929, for five economic classes of United States imports. These indexes are to be used as interpolators for the annual series of the Department of Commerce, and were constructed in such a way as to match the latter closely. They will fill a gap which would otherwise have existed in the quarterly information between the end of the new National Bureau import price indexes in 1923 and the beginning of the Department of Commerce quarterly series in 1929, a gap which can be bridged on the export side by the use of Cowden's indexes.[1]

We did not make any attempt to improve upon the Department of Commerce indexes, but our examination of them confirmed our view that the degree of coverage that can be achieved when only export and import unit values are used is inadequate, and that it is advisable to supplement these with other types of price data, as we have done in our indexes for 1879-1923.

I presented a paper on "Some Sampling Problems in the Construction of Price Indexes," which grew out of this study, at the annual meeting of the American Statistical Association in December.

ROBERT E. LIPSEY

OTHER STUDIES

Several monographs in preparation are devoted to the economies of other countries than the United States. British governmental activity is treated in *The Growth of Public Employment in Great Britain,* by Moses Abramovitz and Vera Eliasberg, which is now in press, and in the companion monograph on governmental expenditures in Britain by Alan T. Peacock, which is near completion. Gerhard Bry's book, "Wages in Germany, 1871-1945" is being prepared for press. Two studies deal with the Canadian economy: *Concentration in Canadian Manufacturing Industries,* by Gideon Rosenbluth, is in press; "The Canadian Balance of Payments since 1868," a Technical Paper by Penelope Hartland, is being revised preparatory to review by the Board.

Oskar Morgenstern's book, "International Financial Transactions and Business Cycles," will shortly be ready for review by the Board. Several of the conferences recently held have made significant contributions to our knowledge of international economic relations and foreign economies, namely, the conferences on capital formation and economic growth, the measurement and behavior of unemployment, problems in the international comparison of economic accounts, and consumption and economic development. A conference on international economics was held in April 1956. For reports on these conferences, see Part Two.

[1] Dudley J. Cowden, *Measures of Exports of the United States,* Columbia University Press, 1931.

National Bureau Publications

Instructions for ordering publications on page 88.

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